THE IRON TRADE REVIEW

VOLUME XXXV CLEVELAND, OHIO, SEPTEMBER 4, 1902 NUMBER 36

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Emphasis is given to the serious effect of the coke shortage in impairing blast furnace efficiency, by the fact that five furnaces in the Central West have been blown out because of the damage accumulating through frequent banking. In the Mahoning and Shenango Valleys a number of furnacemen are contemplating banking from Saturday to Tuesday, while the present embargo continues so that enough coke may be accumulated to insure a full output during running time. The proposal indicates the strait of the furnace interests, and the serious feature of it is that months will probably pass before relief will come. At the same time the Connellsville region is making record outputs, nearly 300,000 tons a week being reached. Several Kentucky, Tennessee and Virginia furnaces have been compelled to bank in the week because of continued shortage in the coke supply from the Virginias. What is most to be feared from the strained fuel situation is such an advance in the price of pig iron as will have its effect upon consumption. Southern producers who are willing to sell iron for next year have put up their prices, and $18.50 at Birmingham for No. 2 foundry, delivered in the first half of 1903 is minimum, while $19 and $20 and higher are asked. A part of this advance is due to the 50 cents added to pig iron freights, effective Sept. 15. It is probable that this action of the Southern roads will be followed by an advance in freight on Northern iron, bringing back the rates prevailing in 1899 and the early part of 1900. It is evident from the continued call for iron for delivery in the next four months—the new requirements of foundries for this year seeming to increase with every week—that foreign iron must be used to a larger extent than has been counted on. In July pig iron imports were at the rate of 2,000 tons a day. The rate is greater now, and foundrymen in the Central West and in the Chicago District who have not had foreign iron in their mixtures since 1879 and 1880 are now facing the alternative of using it or shutting down. The wait in the steel market continues. Foreign billets can be had at $30 delivered in the Pittsburg District, German manufacturers being evidently anxious for business. The domestic situation is unchanged in the face of the pig iron scarcity, but buyers are now talking $31 at Central Western mill. Finished material markets show sustained activity in the heavier forms, while among the laggards shteets are in better demand. Structural material imports are likely to be more of a factor, the mills being sold as a rule for six months in the new year. Rail mills have now on their books 1,500,000 tons of standard sections to be rolled in 1903, this including contracts carried over. The tinplate industry has now a very considerable percentage of capacity idle; in the wire industry the same is true though to a less extent. In light sheets a greater capacity will be needed if the demand of the past two weeks keeps up. The three industries together represent not a little idle plant, and should the chief producer decide on a policy of full operation prices might become uncomfortable for concerns buying raw material in the market.

PITTSBURG.

OFFICE OF *The Iron Trade Review*, }
429 PARK BUILDING, Sept. 3 }

With but few exceptions the furnaces located in the Mahoning and Shenango Valleys and in the Wheeling District are losing from 24 to 48 hours' output weekly on account of the non-delivery of coke. While deliveries at the stacks are normal early in the week, they fall off towards the end, with the result that banking must be resorted to for various periods during Friday, Saturday and Sunday. The past week was no exception and the indications are that no relief will be felt for some months. The railroads have neither sufficient yard capacity nor motive power to move all the material offered and the furnace operators will be compelled to suffer until both can be increased. During the winter months the situation will be much worse than at present and the furnacemen are already discussing the advisability of banking their furnaces every Saturday until the following Tuesday. In this way they figure that there would be a sufficient accumulation of coke to permit the proper operation of the furnaces at least four days a week and the production of off iron would be greatly reduced. Should this be resorted to, the production of not only Bessemer iron, but foundry and forge as well would be curtailed more than 40 percent and the effect on prices is very apparent.

At present no less than five furnaces are out of blast as a direct result of the continued banking and several of these must be relined before they can again be placed in operation. Other stacks will suffer likewise if they have to continue banking and all the furnace operators are losing heavily on account of the failure of the railroads to provide for the increased trade. At nearly all of the coking plants in the Connellsville region, the sidings contain trains of loaded cars awaiting engines, but the railroads have not sufficient motive power to care for the cars. It has been stated that it is not an infrequent occurence for loaded cars to remain on sidings from one to two weeks before they are moved. While furnaces continue to bank on account of their inability to secure coke, the Connellsville region is breaking records in coke production. The week ending Saturday, August 23, was the largest in the history of the region so far as output is concerned, nearly 300,000 tons having been produced in the upper and lower districts.

The advance in pig iron freight rates made by the railroads operating south of the Ohio river is of great interest to consumers in this district, not only on account of the effect on the cost of their iron for next year's delivery, but because it is believed that the roads north of the Ohio and those carrying iron from the Virginia furnaces will also reestablish former rates. The Southern roads have increased the rate from $4.15 to $4.65 per ton from the Birmingham district to Pittsburg, to become effective Sept. 15 on all new business taken by the furnaces and reported to the railroad commissioner after Sept. 5. The increase does not affect the freight rates on iron that has been sold and will be sold to Sept. 5 for delivery the remainder of this year, but the new rate will be applicable on all deliveries after Jan. 1. As the Southern furnaces have practically no iron for sale for delivery the remainder of this year the new rate will be applied to only a very small tonnage for 1902. The increase in the freight tariff on iron for delivery the first half of next year falls on the consumers, as all contracts closed for that delivery by the Southern furnaces were closed at f. o. b. quotations, as previously noted in these columns. The Northern roads are also considering the restoration of former tariffs and it is probable that the increase will

be decided upon within a few months to become effective on Jan. 1, 1903. This would mean a 90 cent rate from Valley furnaces to Pittsburg and an advance of 25 cents is also anticipated from Virginia furnaces to this district.

The pig iron market remains quiet, while in finished lines heavy buying is largely for next year's delivery. The demand for structural material for delivery next year continues heavy. The American Bridge Co., owing to its inability to secure material cannot promise to commence work on new contracts within the next eight months. This indicates that the output of the structural mills of the country almost through the entire first half of next year has already been purchased. Deliveries on plates cannot now be promised before the first of the year despite the fact that the Cambria Steel Co. will have a new 134-inch mill in operation next month. The tin plate market continues quiet and the indications are that the mills of the American Tin Plate Co. that are closed at present will continue closed for some time to come. On the other hand the sheet trade is reported in much better condition, sales during the week being larger than during the corresponding weeks for the past two years.

PIG IRON.—Although there have been no sales of Bessemer iron for some time, dealers and furnacemen having small lots of this product for delivery the last quarter are advancing asking prices and as high as $22 to $22.25 at the furnace is now quoted for this delivery. With the curtailment of production due to the banking of the furnaces, there is little doubt that there will be a heavy demand for all available Bessemer during the last month of this year and extremely high prices will no doubt rule. Sales of foundry iron for delivery next year have been made this week amounting to about 2,000 tons at prices ranging from $22.25 to $22.75 for Northern No. 2. Southern No. 2 is held at $23.15 to $23.65. There has been practically no foreign pig iron purchased in this market despite the tempting prices at which it has been offered. The market in forge and basic also continues quiet. No. 2 foundry for prompt delivery in carload lots commands from $24 to $24.50. Forge is quiet and is quoted at $21.50 to $21.75. We revise quotations as follows, the figures on foundry iron being for delivery in the first half of 1903:

Bessemer, Valley	$21 00 to 21 75
Bessemer, Pittsburg	21 75 to 22 50
No. 1 Foundry	23 25 to 23 75
No. 2 Foundry	22 25 to 23 25
No. 3 Foundry	21 75 to 22 25
Gray Forge, Pittsburg	21 50 to 21 75
Chilled Basic, Valley	20 75 to 21 00
Chilled Basic, Pittsburg	21 50 to 21 75

STEEL.—Very little domestic steel is being offered in this market and there have been no large transactions during the week. Bessemer steel is quoted at $32 to $32.50, Pittsburg, while open-hearth is held at an advance of $1 a ton. There has been no buying of foreign steel, although the offerings are large at $30 to $30.50, delivered Pittsburg. Wire rods are held at $36.50 to $37 for early delivery.

FERRO-MANGANESE.—Domestic quotations for 80 percent continue nominal at $52.50 per ton, delivered at buyer's mill, while the English product is offered at the same price. German manganese is held at $51.50, delivered anywhere in the United States. We note no transactions.

SPELTER.—The market continues firm and prime Western grades continue to be held at 5.38½c to 5.40c. Pittsburg.

MUCK BAR.—Reports of the importation of German muck iron have been denied by large importers as the price delivered in this district would be higher than the price for the domestic article. The market continues quiet at $36.50 to $37 per ton.

SKELP.—The skelp market continues quiet, steel skelp being held at 2.15c to 2.20c, while iron, both grooved and sheared, is quoted at 2.10c to 2.12½c.

RAILS AND TRACK MATERIAL.—Quotations remain unchanged on standard sections for contract delivery, but lots of seconds for early delivery command from $5 to $7 per ton above the agreement quotations. We make the following quotations: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $46; 12 pounds, $44; 16 pounds, $42; 20 pounds, $40; 25 to 40 pounds, $38 to $40. Track material: Spikes, 2c to 2.05c; track bolts, square heads, 2.50c; hexagon heads, 2.65c; fish plates, 1.60c.

BARS.—The steel bar market is quiet and the new business that is being closed is limited entirely to very small lots for early delivery. Iron bars are very firm at prevailing prices and deliveries are not nearly as good as on steel bars. We make the following quotations: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer under 3 inches, 1.70c; over 3 inches, 1.80c; bar iron, 1.80c to 1.90c, Pittsburg, with full freight added to point of delivery. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots; refined iron bars, 2.25c and upwards.

PLATES.—None of the plate mills can now promise deliveries before the first of next year and premiums are secured amounting to $5 a ton for deliveries during January and February. Agreement quotations are unchanged, as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plate more than 100 inches wide, 5c extra 100 pounds. Plate 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5 cents extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

STRUCTURAL MATERIAL.—The McClintic-Marshall Construction Co. was awarded an erecting contract this week calling for 1,000 tons of structural material. The American Bridge Co. has such an immense tonnage booked that work on new contracts cannot be promised within eight months. While the company has the facilities for handling these contracts at an earlier date, the material cannot be secured. It is conservatively estimated that the structural mills of the country now have contracts on their books calling for 300,000 tons of material for delivery next year. Quotations on material for delivery in 1903 are as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

PIPES AND TUBES.—Despite the increased pipe producing capacity of the country, the competition of the new mills is scarcely felt owing to the heavy demand that exists in all lines. This indicates that the demand for all kinds of pipe is much larger than ever before. Quotations to jobbers in carload lots, with freight added to destination, are as follows:

MERCHANT PIPE.

	Black Percent.	Galv. Percent.
⅛ to ⅜ and 11 to 12 inches	60	48
½ to 12 inches	67	55

BOILER TUBES.

Steel.

	Percent.
1 to 1½ inches	45
2¼ to 5 inches	62½
1¾ to 2¼ and 6 to 13 inches	62½

Iron.

	Percent.
1 to 1½ inches	42½
2¼ to 5 inches	50
1¾ to 2¼ and 6 to 13 inches	40

CASING.

	S. and S. Percent.
2 to 3 inches	58
3¼ to 4 inches	60
4¼ to 12½ inches	63

SHEETS.—The market for black sheets during the past week has been quite active and the indications are that the demand during the next two months will be much larger than ever. As the demand increases additional idle mills will be placed in operation. Galvanized sheets are firm at unchanged prices. We make the following quotations in small lots from jobbers: Nos. 10 and 12, 2.40c to 2.50c; 14 and 15, 2.50c to 2.60c; 16, 2.60c; 18 and 20,, 2.70c to 2.80c; 22 and 24, 2.80c to 2.90c; 26, 2.90c to 3c; 27, 3c to 3.10c; 28, 3.10c to 3.20c; 29, 3.25c to 3.35c; 30, 3.35c to 3.45c. Galvanized sheets, in carload lots to consumers, are quoted at 3.05c for Nos. 10 and 11, 3.45c for Nos. 18 to 21, 4.20c for No. 27, and 4.50c for No. 28. Galvanized sheets, mill shipments in carload lots to consumers are as follows: Nos. 10 and 11, 3.05c; Nos. 12 to 14, 3.15c; Nos. 15 to 17, 3.25c; Nos. 18 to 21, 3.45c; Nos. 22 to 24, 3.75c; Nos. 25 and 26, 4c; No. 27, 4.25c; No. 28, 4.50c.

WIRE AND WIRE NAILS.—The fall demand is opening up strong, orders for all kinds of wire for fencing purposes being exceedingly heavy. Cut nails are firm at unchanged prices. We make the following quotations: Wire nails in carload lots, $2.05 per keg; smaller lots,, $2.10 and $2.15; plain wire, $2 in

carload lots and $2.10 in less than carload lots to retailers; galvanized wire, $2.40 in carload lots; polished staples, $2.20, and galvanized staples, $2.60; painted barb wire, $2.60, and galvanized, $2.90. These prices are quoted on a Pittsburg base plus the actual freight to destination. Cut nails are held at $2.05 in carload lots and $2.10 in less than carload lots, Pittsburg, plus freight to destination.

MERCHANT STEEL.—The market continues firm in all lines at unchanged prices which are as follows: Turned cold rolled ground shafting in carload lots, 47 off, and in less than carload lots, 42 off; tire steel, 2.25c to 2.30c; toe calk, 2.35c to 2.45c; sleigh shoes, 2.25c to 2.35c; machinery steel, 1.70c; smooth machinery steel, 1.75c. Tool steel, 7 cents and upwards.

OLD MATERIAL.—The market continues quiet owing to the refusal of the large consumers to buy heavily at the high prices prevailing at present. We revise our quotations, gross tons, as follows: Cast scrap, $19 to $19.50; heavy melting stock, $21 to $21.50; No. 1 wrought scrap, $22 to $22.25; steel rails for rerolling purposes, $23; car wheels, $21.25 to $21.50; borings, $10.50 to $11; turnings, $10.50 to $11; low phosphorus melting stock, $24 to $24.50.

COKE.—During the week ending Saturday, Aug. 23, the production of the Connellsville region, according to figures compiled by the Connellsville *Courier*, was 3,000 tons in excess of the production of the previous week and 2,000 tons in excess of the greatest production ever before recorded in the region. The estimated tonnage of the upper region for this period amounted to 254,748 and of the lower region 44,430 tons. At this rate the output this year will exceed that of 1901 by more than one million tons. Although consumers of both furnace and foundry coke are anxious to close contracts for delivery the first half of next year, the coke producers refuse to name prices. It is not probable that the latter will consider prices on next year's tonnage until the latter part of November. Furnace coke for prompt shipment is being sold at $3.50 to $3.75 per ton while occasional carload lots of foundry coke command from $4 to $4.50 per ton. Several large consumers of foundry coke have already offered to close contracts for the first half of next year at $3.25.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, Sept. 2.

Several Southern furnaces have been compelled to bank in the past week on account of the scarcity of coke, and more are expecting to follow in a few days. Not since the anthracite miners' strike commenced, have the shipments of coke into this territory been so low as in the week just closed. All the local and nearby furnaces are depending upon the day's receipts to keep in blast, and these have so diminished that but few if any furnaces are working to their full capacity. Foundrymen are suffering as keenly as furnacemen from the shortage, and the poorest quality of coke finds ready buyers at from $8 to $12 a ton, according to the closeness of the relation that exists between the buyer and the seller. One foundryman reports that he was offered some Connellsville coke at $14 a ton; another that he paid $10.50 for a carload of West Virginia coke. This shortage has naturally stimulated the demand for spot iron, the price of which has again advanced. No. 1 soft, which is the only grade offered for prompt delivery, is now quoted at $27.65 to $28.15, and finds willing buyers at this price. There has been an active demand for finished iron and steel, particularly for bar iron. Several thousand tons of structural steel for bridge work have been sold during the week, and inquiries for standard rails have been received from Western roads, aggregating 75,000 tons. Sellers of light sections report that the demand for 12-, 16- and 20-pound rails is more than double that for the heavier grades. The demand for scrap is brisk and prices are firm.

PIG IRON.—With practically all the furnaces out of the market, little has occurred to change the local situation from that reported last week. There is an ever growing and insistent demand for spot iron, which has largely increased in the last few weeks as a result of the enforced idleness of a number of furnaces on account of the scarcity of coke. Every day adds more furnaces to the list of those already banked from this cause, and while local and nearby stacks have been able in the past few weeks, by dint of much effort in securing coke, to keep in operation part of the time, they report this week that unless the situation improves very quickly, they will have to go out of blast entirely for the time being. The price of spot iron continues to move upward, No. 1 soft now being quoted at $27.65 to $28.15, and sales of several hundred tons have been made at these prices. One seller reports that over 75 inquiries for iron for delivery this year were received in one day, the orders averaging from carload lots to 300 and 400 tons. Except for an occasional small lot of "off" iron, which is promptly taken at the seller's price when offered, no local made iron can be obtained in this market either for future shipment or prompt delivery. The inquiry nevertheless is very large, and includes some orders running into four figures. Silvery iron high in silicon is extremely scarce, the last sale reported being at $32 Birmingham. Charcoal furnaces, both Northern and Southern, are sold up for this year, and the latter for practically the first six months of 1903. The 50-cent advance in freight rate from Birmingham, to Chicago, becomes effective September 5th, making the freight between these points $4.15. Our quotations on Southern iron have been changed accordingly. Considerable foreign iron is being sold in this market, on the basis of $25.50 to $26.50, which serves to relieve the situation in a slight degree. The following quotations are for delivery in 1903; for earlier shipments from $2 to $3 a ton higher is asked.

Lake Superior Charcoal	$27 00 to 28 00
Local Coke Foundry No. 1	24 00 to 25 00
Local Coke Foundry No. 2	23 75 to 24 25
Local Coke Foundry No. 3	23 25 to 23 75
Local Scotch Foundry No. 1	23 50 to 24 50
Local Scotch Foundry No. 2	23 00 to 24 00
Southern Coke No. 1	23 65 to 24 15
Southern Coke No. 2	23 15 to 23 65
Southern Coke No. 3	22 65 to 23 15
Southern Coke No. 4	22 15 to 22 65
Southern No. 1, soft	23 65 to 24 15
Southern No. 2, soft	23 15 to 23 65
Southern Gray Forge	21 15 to 21 65
Southern Silveries	24 15 to 24 65
Jackson Co. Silveries	28 00 to 29 00
Ohio Strong Softeners	25 60 to 26 10
Alabama Car Wheel	27 15 to 27 65
Malleable Bessemer	25 00 to 26 00

BARS.—A good tonnage of new business in bar iron continues to come to mills, among the orders being several for over 1,000 tons. The bulk of this is placed by the manufacturing trade, who are finding that their requirements will exceed the tonnages contracted for. Deliveries extend several months ahead. Specifications are being freely sent in, the entire output of mills going into immediate consumption. We quote Chicago delivery, Bessemer steel, 1.75c to 1.85c; angles less than 3x3, 1.85c; iron, 1.95c; hoops, 2.15c. Prices for prompt delivery and out of store, steel, 2c to 2.10c; iron, 2.20c to 2.25c; hoops, 2.40c to 2.45c; angles, 2.50c to 2.60c.

SHEETS.—For sheets of heavy gauges, there is an insistent demand. Delivery cannot be obtained on any sizes within three months. Jobbers report that the demand for both black and galvanized sheets is active. We quote No. 27 black, Chicago delivery, 3.15c to 3.25c; galvanized, 4.40c to 4.45c; out of store, No. 27 black, 3.35c to 3.50c; galvanized, 4.60c to 4.75c.

STRUCTURAL MATERIAL.—Contracts aggregating several thousand tons have been placed during the week by bridge builders. No deliveries can be obtained, however, earlier than nine months. Specifications are being asked on a large building to be erected in this city requiring about 3,000 tons of steel. Other larger structures are in prospect which will require considerable material. Some small lots of foreign shapes have been sold by jobbers. We quote mill prices as follows: Beams, 15 inches and under, 1.75c; 18 inches and over, 1.85c; structural angles, 3x3 to 6x6, 1.85c; angles, channels and tees, smaller than 3 inches, 1.85c base; plates, 1.75c. Prices on lots from store are based on the necessities of buyers and according to the size or order. Store prices vary from 2½ to 4 cents a pound.

BILLETS.—A few small sales of domestic open-hearth billets for forging purposes are reported, the price being $38. Foreign material is quoted at $31.50, based on sizes averaging 4x4.

RAILS AND TRACK SUPPLIES.—A number of Western railroads are in the market for heavy sections, the inquiries aggregating 75,000 tons. Light rails are active, the demand being heavier for 12, 16 and 20-pound rails than for other gauges. Large orders are also being placed for track supplies, bolts and nuts being the only kind obtainable for this year's delivery. We quote heavy sections, $28; second quality, $27; light rails,

45 pounds, $34 to $35; 12 pounds, $40 to $41, with regular differentials for intermediate sizes; out of store, $45 to $50; splice bars, 2.25c; spikes, carload lots, 2.45c to 2.55c; track bolts 3½x¾, with square nuts, 3.05c per 100 pounds; with hexagon nuts, 3.20c, with usual differentials for other sizes.

MERCHANT STEEL.—All the mills report that specifications are extremely heavy, but that new business is comparatively light. This is due to the fact that none of the mills are in the market. Such transactions as are closed are done through jobbers, who have stocks on hand or orders placed with mills. We quote mill shipments, Chicago delivery, as follows: Smooth finished tire steel, 1.95c to 2c; open-hearth spring steel, 2.65c to 2.75c; sleigh shoe, 1.75c to 1.80c, flat sizes; concave and convex, 2c; out of store, 2.15c; cutter shoe, 2.40c to 2.60c; machinery steel, 2.15c to 2.25c, base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.25c to 2.35c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 per cent to 10 percent higher; cold rolled shafting, carload lots, 47 percent off, Chicago; less than carload lots, 42 percent off, Chicago.

CAST IRON PIPE.—There is not a heavy demand, though prices are firm. Some municipal contracts are pending, buyers holding off temporarily on account of the high price. We quote 4-inch water pipe, Chicago delivery, $36; 6-inch and larger, $36; gas pipe, $1 a ton higher.

MERCHANT PIPE.—There is a fair volume of business being placed, and manufacturers are satisfied with the outlook. Quotations are unchanged, as follows:

MERCHANT PIPE, RANDOM LENGTHS.

(Jobbers, Chicago Basing Discounts.)

	Black Percent.	Galv. Percent.
⅛ to ½ in. inclusive	58½	46½
¾ to 12 in. inclusive	65½	53½
(Consumers, Chicago Basing Discounts.)		
⅛ to ½ in. inclusive	56½	43½
¾ to 12 in. inclusive	63½	50½

BOILER TUBES.

Steel.

	Percent.
1 to 1½ in.	35
1¼ to 2½ in.	45
2¾ to 5 in.	55
6 to 13 in.	47½

Iron.

	Percent.
1 to 1½ in.	35
1¼ to 2½ in.	32½
2¾ to 5 in.	42½

PLATES.—Independent mills are booking numerous orders for light plates, the demand for material of gauges ⅜, 5/16 and ¼-inch being exceptionally good. Tank steel for delivery this year is uqoted at two cents. We quote mill prices, future shipments, Chicago delivery, tank steel, ¼-inch and heavier, 1.75c to 2.15c; flange steel, ¼-inch and heavier, 1.85c to 2.25c; from stock, tank steel, ¼-inch and heavier, 2.30c to 2.50c; 3-16, 2.40c to 2.60c; No. 8, 2.45c to 2.65c; flange steel, 2.50c to 2.60c.

WIRE AND WIRE NAILS.—There is no diminution to be noted in the heavy demand for all kinds of wire material which has come to the surface in the last few weeks. Jobbers in agricultural districts are laying in heavy stocks for the fall trade, and as this is expected to be very heavy, the orders are generally of larger tonnage than heretofore. Prices to jobbers are as follows: Smooth wire, carload lots, $2.10; painted barb wire, $2.70; galvanized barb wire, $3; wire nails, $2.15; staples, $2.25. Retailers' prices, five cents higher than above.

COKE.—There is no improvement, the local situation being worse if anything. A number of Southern furnaces have gone out of blast during the past week, and more are expecting to follow in a few days. None of the local stacks has any stock on hand, and none is working to its full capacity. Some foundrymen report that they contemplate shutting down until the supply increases. Sales of West Virginia coke are reported at $10.50, and one foundryman asserts that he was asked $14 for Connellsville coke last week. Almost any price will be paid, providing the coke can be obtained. It depends largely on the relations which the buyer and seller have heretofore maintained.

OLD MATERIAL.—A large tonnage of scrap has come into the market not previously figured upon, by the intention, according to reports, of railroads to scrap all their 20-ton cars. It is estimated that about 15,000 cars will be scrapped in this city within the next two months, from which about 100,000 tons of scrap will be taken. Not all of this, however, will come into the open market, as the wheels, journals, rods and bolts will doubtless be used by the railroads in the construction of cars of larger capacity. Buying during the week has been quite brisk, and prices show an upward tendency. The following quotations are on gross tons:

Old Iron Rails	$24 50 to 25 50
Old Steel Rails (Mixed Lengths)	19 00 to 19 50
Old Steel Rails (Long Lengths)	23 50 to 24 00
Relaying rails	31 00 to 32 00
Old wheels	20 50 to 21 00
Heavy melting steel	17 50 to 18 00
Mixed country steel	15 00 to 16 00

The following are selling prices per net ton:

No. 1 R. R. wrought	$21 00 to 21 50
No. 2 R. R. wrought	19 50 to 20 00
Dealers' forge	16 00 to 17 00
No. 1 busheling	15 50 to 16 00
No. 1 R. R. and Machine Cast	16 00 to 16 50
Railway malleable	16 00 to 16 50
Country malleable	15 50 to 16 00
Iron axles	24 50 to 25 00
Steel axles	21 00 to 21 50
Cast borings	10 50 to 11 00
Wrought turnings	14 50 to 15 00
Iron axle turnings	15 00 to 15 50
Steel axle turnings	14 50 to 15 00
Stove plates	12 00 to 12 50
Old iron splice bars	21 00 to 21 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Sept. 3.

As the result of no unloading work being done Sunday and Monday (labor day) the docks at Lake Erie ports are badly crowded and there is certain to be much delay before all the vessels can be unloaded. The general advance of wages predicted last week has been granted and all danger of labor trouble averted. Despite determined efforts of certain vesselmen, there has been no advance in freight rates except that at Escanaba. The situation as to price of ore is somewhat mixed. A few rates have been made at advances of from 50 to 75 cents on iron—Bessemer ore, but other dealers are ruling at old prices and say they see no reason for an advance. On the contrary, they express the opinion that the present conditions in coke and hard coal are likely to have a depressing effect on the price of ore and curtail the business which was expected to be brisk this fall. Those holding for higher prices say that the time for dissipating valuable ore has passed, that the ore situation is now in strong hands, controlled by companies which are not compelled to sell to meet pay rolls, and that if prices commensurate with those prevailing for iron and steel are not obtained, the ore will be held indefinitely.

The reports of ore shipments from northern ports for August have not all been received, but the indications are that the total will be about as large as that for July, which slightly exceeded 4,000,000 tons. Ore receipts at Ashtabula for August were 729,034 tons, a slight decrease compared with July. The receipts at Conneaut were 679,021, making the total for the season 2,553,717 tons, or 1,000,000 tons in advance of last year's shipments for the same period. August ore shipments from the head of the lakes amounted to 2,397,521 tons, against 1,851,855 last year. Of this amount Duluth shipped 947,693 tons, Superior 649,707 and Two Harbors 800,116. Shipments for the season to Sept. 1 from the three ports were 9,719,684 tons, against 6,620,590 last year, the figures by ports being 3,681,929 tons from Duluth, 2,319,340 from Superior and 3,718,415 from Two Harbors.

PIG IRON.—A number of foundries in Cleveland and vicinity are in distress. This is true especially where four or five kinds of iron have been used in mixtures. In such cases foundries are fortunate if they have two or three brands. If a foundry has not bought enough for this year, it is at the mercy of the man who happens to have a few carloads for sale and occasionally as high as $28 has been paid for small lots of spot iron. These unusual conditions seem to have only one possible relief and that is the importing of iron from Great Britain. One large firm represented in Cleveland, which has a contract for importing 3,000 tons of English iron per month from September till April, is now figuring on selling foreign iron in Cleveland. Imported iron has not been used by foundries in this city for 25 years and there are few foundrymen who understand how to use it. Hence it is with extreme reluctance that Cleveland foundrymen contemplate the purchase of foreign iron and they will delay doing so as long as

possible. But present indications are that some of them will be compelled soon to use imported iron or close their foundries. The price of iron is so high and there is so little on the market that business is almost at a standstill. One agent said, "We have plenty of inquiries, but nothing to sell. We have no furnace quotations on which we can rely. When we get an inquiry, we simply send it to the furnace proper, get their price and submit this to the consumer." Reports received in Cleveland from one company's Southern representative are of the sales of No. 3 foundry at $20 at the furnace, Birmingham, and No. 2 at $21 at the furnace for the first half of next year. Since the withdrawal from the market of the leading Southern companies, those now in the market have advanced prices and are not having much trouble in getting what they ask, $19 being usually minimum for No. 2. Reports here are that the coke situation in the Valleys is worse than ever. The Struthers Furnace Co. at Struthers banked its stack Saturday and the furnace at Lowellville has also been stopped by lack of fuel. We quote prices as follows, the figures on foundry iron being for shipment in the first half of 1903:

Bessemer	$21 75 to 22 25
No. 1 Strong Foundry	23 00 to 23 50
No. 2 Strong Foundry	22 50 to 23 00
No. 3 Foundry	21 75 to 22 25
Scotch No. 1	23 00 to 23 50
Scotch No. 2	22 50 to 23 00
Gray forge, Valley	20 50 to 20 75
Lake Superior Charcoal	25 00 to 26 00

FINISHED MATERIAL.—The week has been uneventful in finished material. The building of more ships, dependent upon conditions of the market, mentioned last week, has not yet been decided. Prices on tank steel range from 1.70c to 1.85c Cleveland. The base price for bar iron is 1.80c Pittsburg. Sales out of store, Cleveland, are at the rate of 2c for iron and 1.90c to 2c for steel, while large rounds bring from 2.10c to 2.25c. We quote steel bars at 1.60c for Bessemer and 1.70c for open-hearth, Pittsburg. Sheets and wire continue weak. We quote 2.10c to 2.15c Cleveland for 3-16-inch sheets and heavier. Cleveland prices are on the following basis on mill sales of black sheets: No. 24, 2.90c to 3c; No. 26, 3c to 3.10c; No. 27, 3.10c to 3.20c; and the following prices out of stock: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.55c to 2.70c; No. 16, 2.95c to 3c; No. 18, 3c to 3.15c; No. 20, 3.05c to 3.20c; Nos. 22-24, 3.15c to 3.30c; Nos. 22-26, 3.25c to 3.40c; No. 27, 3.35c to 3.50c; No. 28, 3.45c to 3.60c, for one pass cold rolled. On galvanized sheets Cleveland prices to consumers are as follows for carload lots: Nos. 10 and 11, 3.15c; Nos. 12 to 14, 3.25c; Nos. 18 to 21, 3.55c; Nos. 22 to 24, 3.85c; Nos. 27, 4.53c; No. 28, 4.60c. We quote 1.70c Cleveland for beams and channels for delivery in 1903, business for 1902 being through jobbers at prices from 2½ to 3½c according to sizes and quantity.

OLD MATERIAL.—The market in old material has been quiet with prices stationary. We quote Cleveland prices, all gross tons, as follows:

Old iron rails	$25 50 to 26 50
Old steel rails (over 6 ft.)	22 00 to 23 00
Old steel rails (6 ft. and under)	21 00 to 22 00
Old car wheels	20 00 to 21 00
No. 1 R. R. wrought scrap	22 00 to 23 00
Mill scrap	19 50 to 20 50
No. 1 machine cast scrap	18 00 to 19 00
Iron axles	28 00 to 29 00
Steel axles	27 00 to 28 00
Axle turnings	18 00 to 18 50
Wrought turnings (free from cast)	15 50 to 16 00
Cast borings	11 00 to 11 50
Uncut wrought iron boilers	12 00 to 13 00
Steel boiler plates	17 00 to 18 00
Grate bars	12 00 to 13 00
Pipes and flues (clean)	17 50 to 18 50
Tank iron	17 00 to 18 00
Hoop and band iron	13 50 to 14 50
Sheet iron	11 50 to 12 00
Wrought drillings	15 00 to 16 00
Malleable iron (railroad)	20 00 to 20 50
Malleable iron (agricultural)	17 50 to 18 00
Stove plate	13 00 to 14 00
Heavy steel	18 50 to 19 50

CINCINNATI.

Sept. 2

It is exceedingly hard to get iron from any of the Southern furnaces and consumers are beginning to grow somewhat concerned over the situation. Many furnaces are banked and out of the market entirely. Others are complaining of inability to get cars for shipping out their iron and this same predicament is complained of more seriously by coke makers who say that they are not only unable to get fuel but cannot get cars into which to load their coke. Business is going right ahead and the consumers of pig iron are crying out loudly for iron with which to continue their operations. Foundrymen are being pushed hard by their customers and they in turn are trying to fall back on the furnaces. The furnacemen say that the foundrymen cannot be in a worse shape than they are themselves.

PIG IRON.—The advance in the freight rate on Southern iron of 50 cents a ton, effective Sept. 15, is not affecting business much either way. Iron on old contracts is being shipped on the basis of the old rate of $2.75 Birmingham to Cincinnati where deliveries are any time from now till January 1. Deliveries after that are mainly subject to the advance. New business is being taken at the advanced rate of $3.25 a ton Birmingham to Cincinnati.

There is practically no iron for shipment on new orders before 1903. If there is any iron that can be had for immediate shipment or shipment before January 1 it brings a high premium, in some cases as high as $26 having been demanded for No. 2 foundry at Birmingham. There is nothing selling at this price, of course, but such a quotation shows the straits to which the foundrymen have been reduced. No. 2 at $26 is nearer the present Cincinnati basis than Birmingham, it being stated this week that small sales have been made here at that figure for quick delivery.

Taken altogether the condition is most unsatisfactory. There is little or no iron in the hands of the furnacemen to sell; there is little or no coke that can be gotten hold of by the furnaces with which to make more iron; the coke companies find it hard to get fuel for their operations, and even if they have coke on hand ready to ship they find it almost out of the question to get cars with which to ship it; furnacemen are being called upon by customers to deliver to them what they have not and cannot get; foundrymen are in turn being besought by their customers to furnish castings that they cannot make; and all along the line there is a continual scramble. And with it all the great volume of trade goes on and the demand for finished material keeps up in unison with the demand for all kinds of products of the manufacturing concerns that are after the iron. Prices on pig iron at Cincinnati for delivery after January 1, corrected to conform with the advance in freight rates, are as follows:

Southern Foundry No. 1	$22 75 to 23 50
Southern Foundry No. 2	22 25 to 22 75
Southern Foundry No. 3	21 75 to 22 50
Southern Foundry No. 4	21 25 to 22 00
Southern Foundry No. 1, soft	22 75 to 23 50
Southern Foundry No. 2, soft	22 25 to 22 75
Gray Forge	21 50 to 22 50
Northern Foundry No. 1	26 10 to 26 60
Northern Foundry No. 2	25 10 to 26 10
Southern C. W. iron	27 50 to 28 50
Maleable coke iron	25 00 to 25 75

FINISHED MATEKIAL.—There is no change one way or the other in the market for finished material. The demand keeps up for all kinds and shapes and sizes. Manufacturers are beginning to place contracts more freely. Builders are getting in line for structural material for next year. Railroads and traction companies are considering the purchase of rails. Foundrymen are arranging for their next year's business. All lines are keeping right at it, neither expecting nor thinking about any let up in the demand and the present excellent conditions.

OLD MATERIAL.—In the scrap market things have been a little livelier on account of the scarcity of pig iron. The demand for scrap continues good and all offerings are quickly taken up. Prices remain about the same as last week, being quoted as follows:

Old No. 1 Wrought Railroad, net tons	$20 75 to 21 25
Cast Machine and Foundry, net tons	14 75 to 15 75
Old Iron Rails, gross tons	25 00 to 26 00
Old Steel Rails, gross tons	24 00 to 25 00
Old Short Lengths, gross tons	17 75 to 18 25
Old Iron Axles, gross tons	27 00 to 28 00
Old Iron Car Wheels, gross tons	19 50 to 21 00
Stove Plates, gross tons	11 75 to 12 00
Wrought Turnings, net tons	14 50 to 15 50
Cast Borings, net tons	9 50 to 9 75

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST. Sept. 2,

PIG IRON.—So far as domestic irons are concerned the market in this vicinity is stagnant. The large Southern interests still continue to refuse any orders for the better grades of iron

for delivery in the first six months of next year. They are selling some of the lower grades, however, but there is not much demand for them. So far as No. 2 Southern foundry is concerned, it makes little difference, according to some authorities, when the books for the first six months are opened again, because of the small quantity that can be offered. This is said to be much smaller than some are inclined to believe. It is understood it is practically sold up to July 1, 1903, on No. 2 foundry. Reports from Birmingham to sales agents here indicate that dullness has marked the pig iron market there during the past week. Very little No. 2 is offering for the first half of 1903 and it is reported that $18 at the furnace is minimum. It now turns out that some of the sales made for next year in No. 2 foundry, and which represents quite a respectable tonnage, represent an unusual distribution of deliveries. Some provide for the delivery of one-third the quantity the first two or three months, and the balance during the following three months. Others call for the delivery of one-half the quantity the first three months, and the balance during the next three months. Many sales do not call for delivery before March 1. In Northern irons the scarcity of fuel, which has played havoc with many furnaces, has reduced operations to a minimum. Sales are being made, but the tonnage is small, and at prices ranging from $21.50 to $22.50 for No. 2 at the furnace, according to the grade. Domestic spot iron seems to be growing scarcer with the passing of each week. When any does appear it is in small lots, and easily commands a premium of from $2 to $3. Resales are occasionally made because of this fact. There would be more of them but for the inability to specify the time of delivery, and in this matter the seller is at the mercy of the furnace companies, who don't like to get down to specific details.

The market for foreign irons shows a temporary lull during the past week, but it is believed importations will increase month by month. For Middleboro No. 3 the market is $19 to $20 ex-ship. For Scotch, $22.50 to $23.50. New York prices for this year, mostly nominal, are as follows: No. 1 X Northern, $23.50 to $25; No. 2 X Northern, $22.75 to $23.50; No. 2 plain, Northern, $22.25 to $22.50; No. 1 foundry, Southern, $22 to $23; No. 2 foundry, Southern, $21.75 to $22.50; No. 3 foundry, Southern, $21.25 to $22.75; No. 4 foundry, Southern, $20.75 to $21.25.

Finished Iron and Steel.—The market for structural material is strong, with a good steady business the rule. Shapes wanted for immediate delivery are selling at fancy prices. Although foreign structural material is coming in, it does not seem to have much effect in relieving the stringency. Some good orders are being placed for next year with domestic mills, and in some cases they extend into the third quarter. The buoyant tone to plates has suffered no abatement. The sagging tendency in sheets seems to have run its course, and a firmer tone is looked for. New York prices are as follows: Beams and channels, 15 inches and under, 1.75 to 1.90c; angles, 3 to 6 inches, 1.75 to 1.90c; zees, 1.75 to 1.90c; bulb angles, 2.05 to 2.35c; deck beams, 2.05 to 2.25c; sheared steel plates, tank, 2.10c to 2.15c; flange, 2.25 to 2.30c; fire box, 2.30 to 3.50c; refined iron bars, 1.95c to 2c; soft steel bars, 1.95c to 2.10c. Sheets in carload lots, New York, No. 28, black, 3.18 to 3.25c; galvanized, 70, 10 and 5 off.

PHILADELPHIA.

Sept. 2.

The scarcity of pig iron is the distressing feature of the market and increased supply is dependent to such a large extent upon the settlement of the great strike that it is impossible to say anything definite about the future. Foreign iron is about all that can now be obtained in this market. It is a good substitute so far as price is concerned and a fair one as to quality. There does not seem much probability of an advance in price of foreign iron.

Pig Iron.—Prices are nominally unchanged, but it is difficult to get actual selling prices of American iron. Foreign iron is being used in nearly every foundry in this district. Makers of pig iron have sold their full output for this year and 50 to 60 percent for the first half of next year. Quotations range as follows for deliveries in consumers' yards: $23.50 to $24 for No. 2 X foundry, this year; $22.50 to $22.75 for the first six months of next year; Middleboro iron in small lots, $21 to $21.50 spot delivery, or about $19.50 for shipments in cargo lots; Scotch irons, spot deliveries, $23 to $24.

Billets.—Considerable sales have been made at about $27.50 c. i. f. duty paid for foreign steel, and there is considerable pressure to sell. Domestic steel is nominal at from $32 to $33 for near-by deliveries.

Finished Material.—Bar mills are kept fully employed at quoted rates and buyers willingly pay 1.92c to 2c, providing that deliveries are reasonably prompt. Steel bars are in somewhat better supply. Immediate deliveries command 2 to 2.10c. In structural shapes some sizes are scarce and command extra prices. Lots from store for ordinary sizes are quoted at 2.15c to 2.35c; special sizes, $2.50c to 3c, or for next year's delivery the leading mills quote 1.72c. Plates are in good demand and firm at 2c to 2.10c for ¼-inch tank.

Old Material.—Dealers in old material are doing a fair business with prices about as last week. We quote as follows: Old steel rails, $21.50 to $22; miscellaneous heavy steel scrap, $20.50 to $21; low phosphorus scrap, $27.50 to $28.25; old steel axles, $26.50 to $27.50; old iron axles, $29 to $30; old iron rails, $24 to $25; old car wheels, $20 to $21; choice scrap R. R. No. 1 wrought, $23.50 to $24; country scrap, $18.50 to $19.50; machinery cast, $19 to $20; No. 2 light scrap, forge, $17 to $18; No. 2 light scrap ordinary, $15 to $16; wrought turnings, $16 to $17; wrought turning, choice heavy, $18 to $19; cast borings, $10 to $10.50; stove plate, $13.75 to $14.25.

A company is being organized at Pittsburg to manufacture a new type of steel car according to patents controlled by E. A. Nesbit, who has offices in the Park building. The company is to be organized under the laws of New Jersey with a capital of $5,000,000. Two styles of cars will be built designed for carrying coal and ore. The largest of these will be 31 feet long and will have a carrying capacity of 190,000 pounds. This is 90,000 pounds more than the largest steel cars now in use. It is also stated by the inventor that the cars will weigh about 4,000 pounds less than the steel cars now in use despite the increased carrying capacity. It is stated that plans for a new plant have already been prepared and that the buildings will cover about 23 acres. The main building will be 1,400 feet long and 400 feet wide. In addition to this building a car wheel foundry will be built as well as a truck works. The plant is to have an estimated capacity of 50 cars daily.

It is reported at New Castle, Pa., that the buildings occupied by the Ellwood City, Pa., plant of the American Tin Plate Co. will be removed to New Castle and will be erected near the Shenango tin mill and will be used for housing a foundry to manufacture annealing pots.

The Pittsburg Plate Glass Co. has contracted with Wm. B. Scaife & Sons Co., of Pittsburg, for a 2,500-h. p. We-Fu-Go water softening and purifying system, to be erected at its Elwood, Ind., plant. Among some of the recent contracts closed by Wm. B. Scaife & Sons Co. for the Scaife and We-Fu-Go water softening and purifying systems are the following: Union Steel Co., Donora, Pa., 500,000 gallons; Pennsylvania Salt Mfg. Co., Wyandotte, Mich., 150,000 gallons; the Ogemaw Co., North Bay City, Mich., 1,500-h. p. plant; the Ogemaw Co., West Branch, Mich., 500-h. p. plant; the Lancaster Mfg. Co., Clinton, Mass., 1,000,000 gallons; the Gibson Mfg. Co., Concord, N. C., 100,000 gallons.

The Northside Iron Co., of Sharpsville, Pa., blew out its new furnace Aug. 31. Some important changes requiring three or four weeks are to be made in the arrangement of the top of the stack.

The recently published dispatch to the effect that the entire capitalization of the Brown-Corliss Engine Co., of Corliss, Wis., had been taken up by Pittsburg men is incorrect. It is true that considerable stock has been placed among the leading business men of Pittsburg including a number engaged in iron and steel manufacture, but the company and its organization remain just as before.

THE IRON TRADE REVIEW

Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

PUBLISHED EVERY THURSDAY BY

THE IRON & STEEL PRESS CO.,

ROSE BUILDING, CLEVELAND, OHIO.

G. H. GARDNER, President and Treasurer.
JOHN A. PENTON, Vice-President.
A. I. FINDLEY, Secretary.

A. I. FINDLEY, - - - - - - - - - - - EDITOR.
ROBERT I. CLEGG, - - EDITOR MACHINERY DEPARTMENT.
GEORGE SMART, - - - - - - - ASSOCIATE EDITOR.

CHICAGO : 519 Monadnock Block, GEO. H. GRIFFITHS, Manager.
PITTSBURG : 429 Park Building, A. O. BACKERT, Manager.
NEW YORK : 150 Nassau St., D. C. WARREN, Manager.
THE CENTRAL WEST : R. A. EVANS, Manager.

Subscription, $3.00 per annum. To Foreign Countries, $4.00.
Advertising Rates Furnished on Application.

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

SEPTEMBER 4, 1902

IRON AND STEEL IMPORTS AND EXPORTS.

The very rapid increase of importations of iron and steel is impressively shown in the report of the Treasury Department for July. The following table shows the pig iron and steel imports since Jan. 1. The column of steel includes ingots, blooms, slabs, billets and bars of steel and steel "not elsewhere specified," structural steel being thus included:

IMPORTS OF IRON AND STEEL—GROSS TONS.

	Pig Iron.	Steel.
January	7,833	5,313
February	8,307	2,235
March	17,184	6,570
April	19,067	11,986
May	30,708	24,388
June	32,458	35,588
July	62,156	36,124
Seven months	177,763	122,204

Pig iron is now coming in at the rate of 2,000 tons a day. The increase in the imports of steel has not been so marked in recent months. The table below gives in detail the imports for July, which, it will be seen, amount to more than six times the tonnage for July, 1901.

IMPORTS OF IRON AND STEEL TO THE UNITED STATES—GROSS TONS.

	July.		7 mos. end'g July.	
	1901.	1902.	1901.	1902.
Pig iron	4,404	62,156	23,980	177,763
Scrap	1,669	12,704	8 557	48,650
Bar iron	2,894	3,726	10 070	12,39
Iron (railway, etc.)	243	7,753	853	21,475
Hoops, band or scroll	250	290	457	2,756
Steel ingots, slabs, billets or bars	680	36,124	4,489	122 196
Sheets and plates	962	262	2,190	3,890
Tin and terne plates	8,598	3,143	33,680	39,669
Wire rods	1,439	2,310	9,859	11,107
Wire and wire articles	284	166	2,105	2,084
Total	21,423	128,634	96,240	410,981

The total value of iron and steel imports for July, not including ore, was $4,163,147, against $1,958,579 for July, 1901. For seven months the total was $19,334,418, against $10,344,610 to the end of July, 1901. Iron ore imports in July were 107,095, against 127,615 tons in July, 1901, and for seven months 682,490 tons, against 486,228 in 1901.

Exports are still decreasing in tonnage, but the higher prices of 1902 have made the total value for July a little more than for July, 1901, the totals being $7,931,912 and $7,847,325 respectively. For the seven months the total values were for 1902, $57,263,304, and for 1901, $61,160,730. The decline in exports is more clearly shown in the following table:

EXPORTS OF IRON AND STEEL FROM THE UNITED STATES—GROSS TONS.

	July		7 mos. end'g July.	
	1901.	1902.	1901.	1902.
Pig iron	1,345	2,926	44,598	19,672
Scrap	798	566	7 175	6 240
Bar iron	880	273	14,257	16,510
Wire rods	87	2,638	3,097	9,737
Steel bars	1,371	884	18,404	6,159
Iron rails	0	1	437	177
Steel rails	31,075	5,804	230,977	54,467
Billets, ingots and blooms	137	396	26,778	1,330
Hoops, band and scroll iron	34	128	994	1,308
Iron sheets and plates	571	381	5,015	2,164
Steel sheets and plates	609	1,533	19,712	9,436
Tin plates, terne plates and taggers' tin	4	175	494	1,210
Structural material	4,520	2,077	34,202	38,944
Wire	7,617	7,791	48,108	59,681
Cut nails	520	550	7,009	4,556
Wire nails	1 554	2,699	11,900	14,994
Other nails, including tacks	141	113	1,100	1,009
Total	51,263	29,225	474,197	247,554

EXTENT OF THE RETORT COKE INDUSTRY.

Reference was made in our issue of Aug. 21 to the increase in retort or by-product coke manufacture in the United States. From official statistics it was shown that in 1901 the production of by-product coke was 1,179,900 tons, or 5.41 percent of the total, while 1,533 by-product ovens were under erection at the beginning of this year. While it required eight years from the erection of the first by-product oven in this country to build the industry up to an output of a little more than one-twentieth of the total coke production in the United States, it would appear that a much more important place is to be taken by the retort oven within the coming year. The following statement is a record of by-product ovens built before this year, as well as those building and to be started in 1902 or 1903:

	Type.	Built.	Building and to be started in 1902.	Building and to be started in 1903.
Syracuse, N. Y.	Solvay	30	....	....
Cambria, Pa.	Otto-H.	160	....	....
Glassport, Pa.	Otto-H.	120	....	....
Everett, Boston	Otto-H.	400	....	....
Sharon, Pa.	Solvay	25	....	....
Riverside, W. Va.	Solvay	120	....	....
Ensley, Ala.	Solvay	120	120	....
Dunbar, Pa.	Solvay	50	60	....
Hamilton, Ohio	Otto-H.	50	....	....
Lebanon, Pa.	Otto-H.	....	232	....
Buffalo, N. Y.	Otto-H.	....	....	1128
Sparrows Point, Md.	Otto-H.	....	200	....
Camden, N. J.	Otto-H.	....	100	....
Wyandotte, Mich.	Otto-H.	....	15	....
Delray, Mich.	Solvay	30	30	....
Sharon, Pa.	Otto--H.	....	....	212
Chester, Pa.	Solvay	....	....	50
		1105	757	1390

Total built and building, 3,252.

In addition to the above mention should be made of 10 Solvay ovens in Halifax, 400 Otto-Hoffman ovens in Sydney, N. S., and 30 Bauer ovens in North Sydney, N. S.

The investment in retort ovens in the United States alone, represented in the above list, is approximately $15,000,000. The output of the 3,252 ovens will be approximately 4,000,000 tons of coke a year. As chief of by-products the annual yield of tar will be about

250,000 tons and of ammonia sulphate about 55,000 tons. The value of by-products exclusive of gas may be put at above $4,000,000. By the end of 1903, when all of the plants now building are in operation, nearly 20 percent of the coke made in the United States will be the product of the retort oven.

EXPANSION OF STEEL CAPACITY.

Marine Engineering remarks that "it seems to be the purpose of the steel maker to carry the present business of the country without expansion of capacity, and in the meantime to keep his various customers as well satisfied as possible with such deliveries as he is able to make, lest added capacity in answer to present demand may soon become a useless investment." A careful reading of *The Iron Trade Review's* exhibit of new pig iron, steel and finishing capacity under construction in the United States, contained in our issue of July 31, scarcely bears out this view. With the single exception of structural shapes there is no line of products in which the capacity active in 1903 is not likely to be adequate to the demand if—and this is no small condition—the coke-making capacity of the country increases sufficiently meantime. On the fuel supply really hinges the state of the iron trade in the next year and a half. Coke shortage in the past eight months has meant pig iron shortage, steel shortage, finished material shortage. The great self-contained steel corporations are naturally adding coke ovens commensurate with the increase in their blast furnace, steel works and rolling capacity. But of the 4,900,000 tons output a year possible to the new blast furnaces now under construction and the additions to existing furnaces, a considerable portion, though probably less than half, is dependent upon the market for its coke. Much must be done if a regular and adequate supply of coke is available when the furnaces are ready to start up.

But without clear light as yet on the coke problem, the work of providing new works in every department of the iron trade save the single exception noted is going on bravely. The manufacturers of steel are not going on the theory that today's consumption is the maximum and that any change must be a falling off; but rather that whatever setback comes it will be succeeded by another wave rising to a new high point, because of forces that are steadily moving the world toward a larger consumption of steel. "To carry the present business of the country without expansion of capacity" is about as far from the thought of the captains of the steel industry as could be conceived.

The Soho furnace operated by the Jones & Laughlin Steel Co., Pittsburg, will be blown in in about ten days. The furnace has been out of blast during the past three months undergoing extensive repairs. An automatic skip hoist has been erected to take the place of the elevator arrangement for charging the furnace. Other improvements have also been made which will result in slightly increasing the daily output, which is estimated at 300 tons.

Four furnaces of the open-hearth plant of the Clairton Steel Co., a subsidiary company of the Crucible Steel Co. of America, at Clairton, Pa., will be placed in operation next week. The plant will contain ten furnaces of 50 tons capacity each and the remainder of the plant will be placed in operation during the next two months. The 40-inch blooming mill will also be placed in operation and the remainder of the plant including the cold rolling department will be placed in operation during the next three months. One of the three blast furnaces will be blown in about January 1, 1903.

The Canadian Iron Co. has been organized at Youngstown, O., with a capital of $200,000. The incorporators are J. Craig Smith, Edward Ritchie, Grant S. Whitslar, Grant L. Cleveland and Frank Brown, all of Youngstown. The company has acquired the property of the Abbott-Mitchell Iron & Steel Co., located at Belleville, Ont., 150 miles east of Toronto, Canada. The plant, which for the present is inactive, manufactures bar iron, bar steel, cut nails, horse shoes, railroad spikes, track bolts, washers, etc. The price paid was $47,000. Pittsburg people will be interested with the incorporators and extensive additions are contemplated. The plant will be started as soon as necessary repairs can be made.

The Canonsburg Steel & Iron Works, Canonsburg, Pa., has been incorporated with $250,000 capital. The company will operate a tin plate plant.

Edward P. Merrill, for the past four years assistant superintendent of the Spanish-American Iron Co. at Santiago de Cuba, has been appointed general superintendent of the Island Creek Coal Co., which is developing a coal property in Logan Co., West Va. Mr. Merrill is succeeded at Santiago by De Berniere Whitaker, for some time connected with the Spanish-American Iron Co., and previously chemist at Sparrows' Point, Md.

The American Insulated Wire & Cable Co., recently incorporated in New Jersey, has leased for three years a factory at Stamford, Conn., to be equipped for the manufacture of insulated wire and cable. The company will employ 50 hands and probably more later. The Stamford Engine & Machine Co., of Stamford, which has been organized by local and New York capitalists, has leased a factory building and has purchased the right to manufacture the Bert Merry engine.

J. Schoenawa, superintendent of the steel works and manager of the blast furnace department of the Roechling Works, Voelkingen, Saar district, Germany, is in the United States, visiting the principal iron and steel plants.

The annual meeting of the stockholders of the Pittsburg Stove & Range Co., Pittsburg, was held on Monday, Sept. 1. Officers were re-elected as follows: John D. Nicholson, president; John S. Graham, secretary and treasurer; James F. McKee and George J. W. Bissell, vice presidents. The officers, together with A. M. Neeper, W. S. Huntley, and C. H. Bradley, constitute the board of directors.

The Peninsular Furnace, Detroit, recently acquired by the Peninsular Iron Mfg. Co., Solon Burt, secretary, will probably be repaired and ready to resume about Sept. 15.

The September meeting of the Foundrymen's Association of Philadelphia, appointed for Sept. 3, was the first since the summer recess. The paper of the evening was by Adam C. Harper, of Chester, Pa., on "The Keller Pneumatic Foundry Rammers." Secretary Evans in announcing the meeting says: "The outlook for foundry business is reported to be better than ever before, as most of the foundries have all they can do at satisfactory prices; in fact, we hear some of the shops have more orders than they can fill, and are employing others to help them out."

A new pig iron selling firm, the Field-Croxton Iron Co., has been formed at Cincinnati, composed of Robert Field, who has been for a number of years a well known pig iron selling agent in the Central West, and Bert Croxton, of the Penn Iron & Coal Co., Canal Dover, O. The new firm will continue to sell the product of the furnaces Mr. Field has represented and will probably add other irons to the list.

The Machinery and Metal Working Trades—News Letters from Selling Centers.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, No. 150 NASSAU ST., Sept. 2.

The month of August passed off in the machinery market in this vicinity with conditions prevailing almost the same as in July. At the beginning of the month the expectation was that dullness would be more in evidence than at any time this summer, but this was far from being the case. Manufacturers asked concerning their operations for the month gave almost the same answer, which was to the effect that while they received no orders that deserved special mention in point of magnitude, they did receive plenty of small orders, and that these came almost daily, so that when they made up their totals for the month they were agreeably surprised at the profitable business represented.

A significant feature of the month's developments was that almost every branch of the machine tool industry shared in the prosperity that was noted. If any exception to this can be taken, it is with the manufacturers of wood-working machinery. Among these it is said that the competition has been keen and prices have been made by some that do not admit of a reasonable profit. Yet all the manufacturers in this line report present business to be very good.

Manufacturers of power transmitting machinery say they never have had so many orders on their books as now. They refer to the increased activity noted during the present year, in additions to old plants and the construction of new ones. Every department of industry has figured in this, with iron and steel concerns giving a particularly good account of themselves. Dealers in machinists' supplies make a similar report and are rushed as never before.

Deliveries are still the chief source of complaint from both manufacturers and purchasers. Everywhere one hears of numerous orders which can be secured if they could be filled with any degree of promptness. The fact that they cannot be taken care of has resulted in good business for second-hand dealers. One large machine tool company, in taking an order for a small tool, promises delivery between 60 and 90 days, while for large tools it will not promise delivery short of three months and from that to five. All talk of recent advances in prices having any unfavorable effect on trade has completely disappeared. The new prices have prevailed long enough, say manufacturers, to dispel any doubt that may have existed as to the wisdom of making them. One of the largest manufacturers stated to your correspondent that he has yet to come across a trade where there was any harping about the recent advances.

Foreign trade has been devoid of any special features, and conditions previously alluded to in this column still obtain. American pneumatic tool companies seem to be devoting considerable attention to finding a market for their products abroad, and recent sales made by them indicate that their efforts are meeting with success. Large ship yards are the chief buyers.

Among foundries a dissatisfaction with the scarcity of raw material is heard on all sides, and in consequence good prices are cheerfully paid for castings that can be turned out within a reasonable time. All forecasts are that the general trade outlook could not be better. The fall is expected to show considerable activity, and it is stated that the inquiries out now leave no doubt of the fact.

One of the features of the New York machinery market is the industrial combinations, which are reported to be forming. During the past few days machine tool builders have had their attention drawn to a report that a movement is under way to effect a consolidation of the machine tool manufacturers of America at a capitalization of from $40,000,000 to $50,000,000. Investigation showed that the report was first heralded through Wall Street news agencies, who upon being interrogated said that the proposed scheme has its inception in Philadelphia, and that beyond that they were unable to give any information. Several prominent machine tool builders declared that they knew nothing about the project now. An officer of one of the largest companies in the trade said that he was absolutely ignorant on the subject. The standing of the company in question is so high in the machine tool industry that it would be practically an impossibility for an industry of such proportions to be seriously considered without this concern being consulted. Some of those interviewed looked upon the scheme as not being even a remote possibility, and pointed to the proposed large capitalization as proof of the fact. One manufacturer said that a number of the small machine tool builders might form a combination, but he doubted if their aggregate plants could make a capitalization of half a million dollars possible without the stock being so watered that the payment of interest on bonds or dividends on stock would be an absolute impossibility.

For about a year rumors have been circulating of a proposed merger of crane manufacturers. As yet nothing tagible in this connection has been accomplished. There are some substantial men in the trade who look upon the plan as both feasible and profitable. Numerous conferences have been held and advices are that with the advent of the fall additional life will be injected into it. The project to effect a combination of the small steam pump manufacturers is still being considered, but if any progress has been made it has been carefully withheld from the public.

The Hooven, Owens & Rentschler Co., of No. 39 Cortlandt St., made some good sales of Hamilton-Corliss engines during the past few weeks, mostly of small horse power.

The Rockwell Engineering Co., of No. 26 Cortlandt St., reports a very good volume of business for August in the oil fuel appliances it manufactures.

Edwin H. Ludeman, of No. 39 Cortlandt St., has made the following sales: two 150-h. p. Murray-Corliss engines, to Standard Oil Co., Constable Hook, N. J., and three 750-h. p. engines of the same make to the Colonial Construction Co., Hudson, N. Y.; also one 250-h. p. Murray-Corliss engine to the Haverhill Box & Board Co., Haverhill, Mass. He has also sold several small horse power Houston, Stanwood & Gamble Co. engines, for installation in sugar mills in Cuba and Mexico, and one 150-h. p. Fitchburg engine to O. J. Maigne, New York City.

Thayer & Co., Inc., manufacturers of steam boilers, at No. 39 Cortlandt St., have received some large orders for boilers from manufacturing establishments in New England. They report the outlook for trade as excellent.

George E. Affleck, of No. 109 Liberty St., manufacturer of iron and brass working machinery, has received some substantial orders recently, especially from Canada.

The Grand Trunk Railway Co. was a large buyer of heavy machine tools recently. One order, aggregating over $20,000 went to the Niles-Bement-Pond Co., of No. 138 Liberty St. It is an unusual thing for a Canadian railroad to come into the New York market for equipment of this kind.

The American Wood Working Machine Co., of No. 108 Liberty St., has shipped considerable of its products to Southern cities recently.

The National Water Tube Boiler Co., of No. 39 Cortlandt St., have been given the following orders: Tennessee Copper Co., Isabelle, Tenn., aggregating 1,300 horse power; Midvale Steel Co., Nicetown, Pa., aggregating 1,040 horse power; and the Keasby & Mattison Co., Ambler, Pa., aggregating 1,500 horse power.

E. S. Boyer, the New York representative of the American Engine Co., of New Jersey, at No. 95 Liberty St., has taken the following orders for American-Ball duplex compound engines: two 325-h. p., Standard Steel Works, Burnham, Pa.; one 250-h. p., North & Judd Manufacturing Co., New Britain, Conn.; one 160-h. p. Franklin Electric & Illuminating Co.,

Glen Clove, L. I.; and one 120-h. p., Loraine House, New York City

The Direct Separator Co., of No. 39 Cortlandt St., is in receipt of several large orders for steam separators from the Allis-Chalmers Co., of Milwaukee, Wis.; the Rand Drill Co., New York; Columbus Street Railway Co., Columbus, O.; Swift & Co., Chicago., Ill., and the Manhattan Railway Co., New York.

The H. B. Smith Co., of No. 123 Liberty St., manufacturer of wood working machinery, reports that its August business was particularly heavy. Orders for wood working machinery of various kinds were received from the Government, amounting to about $20,000. The company recently made large shipments of wood working machinery for installation in several saw mills in various parts of the Philippine Islands, and a good order was also received from the British Electric Car Co., of Manchester, Eng. Additions are now in course of erection at the company's plant at Smithville, N. J., and in order to keep up with its orders the works are now in operation day and night.

At the New York office of the Riter-Conley Manufacturing Co., of Pittsburg, located at No. 39 Cortlandt St., it is said that the company has enough orders on its books to keep its shops going for a year. The orders are for the most part steel works and blast furnace construction.

The National Foundry Co., of No. 32 Sandford St., Brooklyn, has purchased a plot of land, 300x200, on Sanford St., between Park and Flushing Aves., Brooklyn, and proposes to erect a foundry at a cost of $50,000 for the manufacture of press, typesetting, and cordage machine castings, as well as cast iron pipe and fittings.

The Chicago Pneumatic Tool Co. authorizes the announcement that there is no truth in published reports that it proposes to erect a new plant in the vicinity of the Glasgow shipyard, and a new plant in Germany. For the present the company believes that the plants of the International Tool Co. and the Tait-Howard Pneumatic Tool Co. of England, both of which it now controls, are sufficient to meet the requirements of its foreign orders. Both the domestic and foreign business continues, with large sales of air compressors a feature of the former.

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING. Sept. 3.

The machinery business in Cleveland has had an unusually prosperous August, which is ordinarily a dull month for the trade. There has been very little change in prices since the general advance of 10 percent July 1 and buyers seem generally to realize that that advance was justified. While a few who obtained quotations on machine tools in June and delayed purchasing have found that their orders can not be placed at the earlier prices and are inclined to complain, buying has still been freer than is usual for this time of the year. The manufactories of machine tools are running up to the limit of their capacity and a number have either made additions or will do so at an early date. Some trouble has been experienced in getting material, but there has been no serious interruption for this cause.

Work on the new plant of the Brown Hoisting Machinery Co., is progressing satisfactorily. The Ferro-Inclave fireproof roofing made by the company is now being put on the new buildings.

The Ajax Machinery Co. is now making a 6-inch upsetting and forging machine for the Allis-Chalmers plant at West Allis, Wis. It will weigh 110,000 pounds. There are only three machines of equal size in the United States and none larger.

The W. S. Tyler Co. has plans for a new boiler house, which will soon be erected, equipped with water tube boilers. The company will eventually use all water tube boilers, discarding its present steam plant. It is also the intention to equip the entire plant with a sprinkler system for fire protection. The company is now erecting a four-story, strictly fireproof building, to be used exclusively for storing patterns.

The new building of the Acme Machinery Co., an addition 180x80 feet to the old plant, is nearly finished, as is also the new office building. The company's officers modestly say that these additions were designed more to give increased efficiency than to increase greatly its productive capacity. The new shop will be equipped with an electric crane and will be used in the making of large tools. The boiler capacity will be doubled. This company now has a well established export trade, sending its bolt and nut and other machines as far as India.

R. Devens, of the London office of the Brown Hoisting Machinery Co., is in Cleveland on a short business visit. He reports that owing to the South African war and high taxes, business in England has been rather depressed, but he anticipates an early recovery and increased machinery imports from the United States.

The W. D. Graves Electric & Machine Works, which have been doing business at 19 Michigan St., have been moved to Wheeling, W. Va., having been incorporated as the Mutual Electric & Machine Co.

The W. M. Pattison Supply Co. has purchased a site on Hamilton St. and expects to build a new warehouse, although the time for beginning work has not been decided upon. The company has rented an additional store room adjoining the present large quarters on St. Clair St.

The York Machinery Co. is doing a large business in machine tools for automobile companies.

Foote, Burt & Co. have moved into their new factory at 1301-3 St. Clair St. This new plant will give largely increased facilities in handling the company's rapidly increasing business in multiple spindle drills.

The C. O. Bartlett & Snow Co. is now established in its new building on the block bounded by French, Fall, Winter and German Sts. One of the leading specialties of the company is its conveying and elevating machinery. One of their coal loading devices is now being completed for the Pittsburg Coal Co. The company is putting in a dryer for drying coal for the McCormick Harvesting Machine Co., Chicago, the plan being to dry and then grind the coal and use it in that form, thus abolishing the smoke nuisance.

The General Automobile & Mfg. Co. has purchased a factory on Hamilton St., near Marquette, which will be equipped for operation within a few days.

The Cleveland Punch & Shear Works Co. is doing an excellent business, there being a steady demand for such tools as it makes.

The Globe Machine & Stamping Co. has purchased another Bardons & Oliver screw machine and has also added to its stamping department equipment. The company has also put in some die sinking machinery. It has entered a large number of new orders for drop forging dies, of which line of work it is making a specialty. Orders have also been received from two concerns for complete sets of dies, tools and jigs to be used in the manufacture of 1903 styles of gas and vapor stoves and ranges. The company is running the stamping department to its fullest capacity, and reports that the outlook is satisfactory in each of its departments.

The Reade Machinery Co. reports that business during the summer months has been better than was expected. It is receiving a large number of inquiries and its share of orders for machines for fall delivery.

The Chisholm & Moore Mfg. Co.'s business at present is made up of small orders, of which the aggregate is large. A number of malleable casting contracts for the coming year have been made.

During the week past the Bosworth Holding Co. has shipped three carloads of machinery, one each to St. Louis, Pittsburg and New York. This company has orders for three more carload lots to be shipped at once.

The Allis-Chalmers Co. has placed an order with the Peter Gerlach Co., of Cleveland, for 14 stave machines, which will be installed in the barrel manufacturing plant of the Crisna Co.'s Portland cement factory about to be constructed in the vicinity of Barcelona. The cement plant will have an initial capacity of 500 barrels daily. All the equipment will be of American manufacture.

E. I. Leighton, formerly with the Cleveland Punch & Shear Works, has been elected general manager of the Cleveland Machine & Mfg. Co.

The Garry Iron & Steel Co. has recently gone into the manufacture of pneumatic lifting jacks for railroad work.

The Vulcanus Forging Co. is considering the removal of its

plant, possibly away from Cleveland and certainly to a location where there will be more ground space. The company has been so busy that $30,000 worth of orders were sublet last week. The capital will be increased from $100,000 to $150,000 and the erection of new buildings will be begun as soon as the site question is settled. The company is now working about 100 men and twice that many will be employed at the new plant.

WESTERN MACHINERY MARKETS.

Sept. 2.

The Lane & Bodley Co., of Cincinnati, is planning a foundry primarily for its own Corliss engine business and secondarily for a jobbing foundry. The building will be 120 feet wide and of undetermined length, the land owned permitting of 1,000 feet. The company is ready to receive suggestions concerning foundry arrangement, construction and appliances from firms whose business is the erection and equipment of foundries.

J. Howard Ewald, 83 Laclede Building, St. Louis, has been appointed sole agent for Southern Illinois, Missouri and Texas, for the Scaife and We-Fu-Go water softening and purifying systems, manufactured by William B. Scaife & Sons Co., of Pittsburg. Mr. Ewald has been for years identified with the iron and steel industries in the West and is well known in manufacturing and engineering circles. He has made a special study of the subject of water purification.

The Canadian Bridge Co., Walkerville, Can., is installing a second 3-motor electric traveling crane, 25 tons capacity, 60 ft. span, manufactured by the Northern Engineering Works, of Detroit, Mich. This crane will be used to handle heavy girders in the yard.

The Pennsylvania Railroad has given the Allis-Chalmers Co. orders for a number of Sederholm boilers, for the Broad street station in Philadelphia, as well as for the Juniata shops. These boilers have now been in successful use for several years. They are in general use on the sugar plantations in the Hawaiian Islands, where the Allis-Chalmers Co. has furnished a great number of large high lift pumping plants for irrigation purposes.

Machine tool men in Cincinnati are in good spirits over the continued healthy demand for all their products, not only from the home market but from abroad. The business at home comes from all parts of the country. From abroad the orders are coming in from England and Germany. All of the manufacturers say that the advances made not long ago are being held and that machine tools are easily bringing what is asked for them.

All talk about the possible removal from Cincinnati of the American Tool Works Co. has been set at rest this week by the statement from the company that it will not only remain at Cincinnati but will probably occupy new and larger shops inside of a year or so. Since J. B. Doan has been secured to act as manager of the sales department of the company it is understood that the business has been increasing.

Robert Wuest is now announced as the permanent secretary of the National Metal Trades Association following the acceptance of the permanent office of commissioner by Acting Commissioner Dubrul. The offices of the association will continue to be in the Mitchel Building, Cincinnati.

The J. A. Fay & Egan Co., Cincinnati, is considering the erection of a large hotel and boarding house near the new factory buildings that are to be located by the company on the tract of land recently purchased near Bond Hill. It is the intention to provide a good place for men to live without their having to go to down town boarding houses.

The Wm. Powell Co., of Cincinnati, has recently secured some extensive orders for brass work for the Russian government ship repair yards on the Siberian coast.

The Bickford Drill & Tool Co., of Cincinnati, reports a better business for the past summer than it has had in its history.

The S. Obermayer Co. is arranging to put up a large addition to its foundry facing and supply factory in Cincinnati. The addition will practically double the capacity of the plant.

The Lunkenheimer Co., of Cincinnati, is arranging matters as rapidly as possible so as to be able to occupy the new office and building that is being erected adjoining the big factory that has been in operation for some time in Fairmount, O.

The Vilter Mfg. Co., of Milwaukee, Wis., builder of refrigerating machinery and Corliss engines, has recently closed engine contracts with the following, in addition to a large number or orders for refrigerating and brewers' and bottlers' machinery: Midland Rice Milling Co., Midland, Tex., 17x42 Corliss engine; Adler & Oberndorf, Chicago, 16x36 Corliss engine; estate of Anson Eldred, Milwaukee, Wis., 16x30 Corliss engine; T. J. Gardner, Las Animas, Col., 10x15x30 tandem compound Corliss engine; Menasha Paper Co., Menasha, Wis., 16x36 Corliss engine; Menasha Paper Co., for Ladysmith, Wis., 20x42 Corliss engine; Saginaw Valley Traction Co., Saginaw, Mich., 32x60 Corliss engine; Wm. Hellman & Co., Milwaukee, Wis., 8x24 Corliss engine.

The evolution in the machine tool business in St. Louis in the past 20 years has been marked. In the earlier eighties antiquated machinery was common, but there has been a gradual weeding out of the unfit and as much of this equipment has found its way to scrap heaps, modern, up-to-date machines have replaced it. No small part in bringing about this change has been borne by Albert B. Bowman, of 720 North Second St., St. Louis. In season and out of season he has urged upon manufacturers the purchase of improved equipment, often at the sacrifice of his own immediate profits. He has made a close study of the business in the past 25 years and is considered one of the best equipped men in the trade. He carries a line of the American Tool Works Co. machines and represents well known manufacturers in the various lines of metal working tools.

PHILADELPHIA.

Sept. 2.

The volume of business for the month just closed was remarkably large when the time of year is considered. August as a rule is a dull month. While heads of departments have been taking vacations as in previous years business has gone merrily along and orders have piled up in surprising quantities. One machine tool agent, representing several prominent makers, reports that last month was the best in point of aggregate orders that he has ever had, a lot of prospective business being closed up which averaged for the second half of the month over $1,000 each day, the transactions individually being somewhat of a small nature. Other reports from machine tool dealers denote an excellent demand for tools, but with few exceptions orders run for odd machines. A notable exception was an order secured by the J. W. Creager agency from the American Locomotive Works for fourteen Bardons & Oliver turret lathes, ten of tnem of large size.

Perhaps the busiest plant in this section is that of the Baldwin Locomotive Works. While it is rather superfluous to say that "Baldwins are very busy," because they nearly always are, yet the business reported as recently booked there is very heavy, and they do not make public all the orders they take by any means. One of the heaviest orders for locomotives taken by them is the one just booked from the Union Pacific and its allied companies. It calls for delivery next year and is for seventy high class engines, covering both freight and passenger service. An opening is also being kept for the same interests for 40 more locomotives, contract for which will probably be completed very shortly. A recent delivery of ten locomotives makes the total order from this source, as soon as the contract mentioned is signed, 120 locomotives. The Baldwins have just delivered to the Philadelphia & Reading R. R. six new fast freight locomotives, each having six 72-inch drivers. These, which are considered monsters, will be used on the through freights between Philadelphia and Tamaqua and Harrisburg and Allentown, and are the largest of their class equipped for burning soft coal. The Baldwins have just acquired additional properties adjacent to their works and will proceed to erect further buildings for the accommodation of their different departments. And so it goes on with this particular concern, which is destined eventually to cover two or three of Philadelphia's large blocks and is already extending snakelike from the main location to the remoter districts along the tracks of the railroad. With over 10,000 men employed it is no wonder that Philadelphians are prone to judge of the prosperity of the country by the activity which may be in evidence at Baldwin's.

A good many buyers who have for some time been on the

fence are dropping their orders, being unable, through pressure of business, to hold them longer. Expected declines in the prices of raw materials did not materialize, and the recent advances in some lines of tools have in consequence driven a lot of business into the market.

Prices are now being fairly well maintained, and dealers who showed a disposition to be weak kneed when the advanced prices went into effect are making concessions no longer. In other lines of machinery business was very heavy, and the prospect for a continuance of the present condition is excellent.

Foreign business for the month was exceedingly light. While the inquiries from abroad have perhaps been a little more numerous the bookings have been smaller than ever before. There is some indication of orders in the near future from South Africa, but it is not learned that anything has resulted so far, with the exception of a specification booked by parties in York for agricultural machinery.

The Director of Public Works of Philadelphia is advertising for bids upon the new pumping station mentioned in a previous report, for supplying water for the high pressure fire main service in the central part of the city. The bids will be opened Sept. 12.

The Pennsylvania Railroad is getting estimates on a new one-story machine shop 265x50 feet which it is about to erect at Altoona. It is expected that they will come into the market almost immediately for its equipment.

The Niles-Bement-Pond Co. is very busy at both its plants in this city, and has orders enough in hand to carry it along for some time to come. The company is about to erect in connection with its crane department a three-story machine shop 213x56 feet, and is taking estimates on the same.

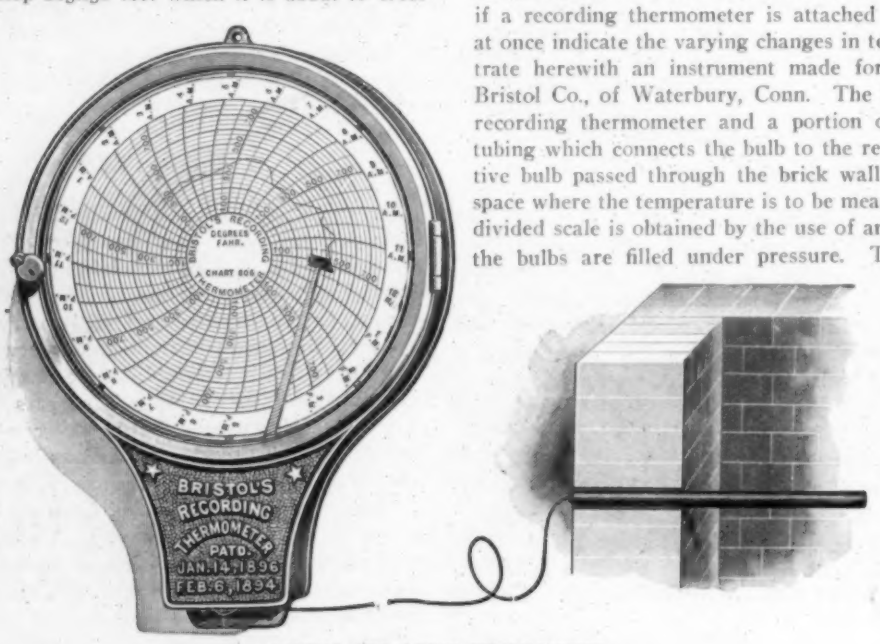
Alfred Box & Co., builders of cranes and hoists, are very busy at their works and have sufficient orders in hand to keep them so for a long time. Among work recently completed and in hand they mention orders for three large electric cranes for the New York Edison Electric Illuminating Co., one for the Newton Machine Tool Works, Philadelphia; one for the Harrison Safety Boiler Works, Philadelphia; one for the Union Traction Co., Philadelphia; one for the Diamond Drill & Machine Co., Birdsboro, Pa.; one for the Seaboard Steel Castings Co., and another for the Tidewater Steel Co., Chester, Pa. They are also shipping four electric jib cranes to the International Steam Pump Co.; four others for the Philadelphia & Reading Railroad Co., Reading, Pa., and one for Robt. Wetherill & Co., Chester, Pa.

The J. W. Paxson Co. had a busy month during August and found business all that was desirable. They have placed the following orders on their books: Delaware Iron Works, Marcus Hook, Pa., a 49-inch cupola, blower and lining; Mutual Machine Co., Washington, N. C., a 35-inch cupola; J. H. Lingle, Bellefonte, Pa., a 54-inch cupola and lining; Diven-Dived Foundry Co.,, Baltimore, ,Md., a 76-inch cupola, blower and lining; Chambersburg Engineering Co., Chambersburg, Pa., an 80-inch cupola and lining; Buffalo Foundry Co., Buffalo, a Paxson-Warren sand blast outfit; Abendroth Bros., Portchester,, N. Y., a 76-inch cupola, blower and lining; Standard Steel Works, Burnham, Pa., four 76-inch cupolas; Weatherly Foundry & Machine Co., Weatherly, Pa., a 76-inch cupola; the Jas. Smith Woollen Machinery Co., Philadelphia, two Paxson-Warren sand blast outfits; P. M. Sharpless, Westchester, Pa., a 54-inch cupola, and to Wm. Reppert, Spring Mill, Pa., a 37-inch cupola, blower and lining.

The Espen-Lucas Machine Works, builders of cold saw cutting off machines, are running their shop to the fullest extent of their capacity on orders for cold saws. The new design of saws which they have recently placed on the market appears to have attracted the interest of the trade and many orders are coming in. For a while they are likely to confine themselves to this class of tools.

THE BRISTOL RECORDING THERMOMETER.

The foundryman is becoming more and more interested in obtaining exact results. Where core ovens are in continual use it has been found that much better results may be obtained if a recording thermometer is attached to these, as this will at once indicate the varying changes in temperature. We illustrate herewith an instrument made for this purpose by the Bristol Co., of Waterbury, Conn. The illustration shows the recording thermometer and a portion of the flexible copper tubing which connects the bulb to the recorder, also the sensitive bulb passed through the brick wall of the oven into the space where the temperature is to be measured. The uniformly divided scale is obtained by the use of an inert gas with which the bulbs are filled under pressure. The varying pressures are proportional to changes of temperature and are communicated to a Bristol recording pressure gauge having the usual revolving chart for receiving the record.



BRISTOL RECORDING THERMOMETER.

One of these recording thermometers has been in use for several years in the foundry of T. Shriver & Co., New York City, who state that with this instrument attached to a core oven there can no longer be any excuse for not properly drying cores without burning them. Ever since the recording thermometer has been employed by them there has been no irregularity in their cores due to imperfect drying.

The Nazareth Foundry & Machine Co., builder of high class machinery, with a specialty of all kinds of castings, located at Nazareth, Northampton Co., Pa., finds its business increasing to such an extent that a new building will be erected this fall, to be devoted entirely to agricultural machine work. A new 10-ton traveling crane is now being erected in the foundry and a new 36-inch cupola will be added which will permit of doubling their output. Conrad Miller, the president, is well known in railroad circles, both in the East and the West. G. A. Schneebeli, vice president, is a large manufacturer of woolen goods and heavily interested in electric railroads. Wm. Bennett, secretary, is interested in many enterprises in the cement and slate regions as is also M. F. Swartz, the treasurer, who is cashier of the Nazareth National bank. R. J. Kellogg, the superintendent, was for many years connected with the machine shop of the Bethlehem Steel Co., Bethlehem, Pa. Franklin H. Brunner, formerly a sales agent of the Bethlehem Steel Co., has recently accepted a position with the company.

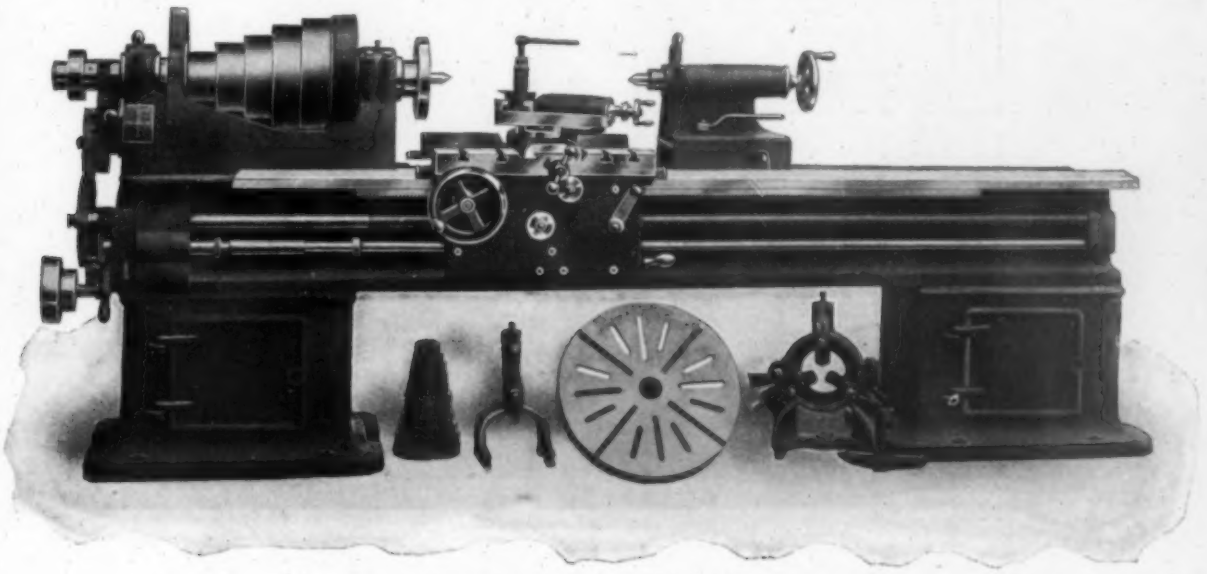
TWENTY-ONE INCH "CINCINNATI" LATHE.

The illustration shows the 21-inch by 10-foot "Cincinnati" lathe built by the P. P. Silk Machine Tool Co., of Cincinnati, and is on the same general lines as the 17 and 19-inch machines made by this firm. The spindle is made of hammered crucible steel and is of liberal dimensions. The boxes are of best quality phosphor bronze. The centers are made to Morse No. 4 taper. The screw feed reverse is on the outside of the head, where it is easily accessible for cleaning or repairs. This design has some advantages over the plan of having the reverse mechanism inside the head, as the spindle does not require to be removed in order to get at the reverse; nor is it necessary to weaken the head in order to find room for the reversing device. Then the cone pulley for driving the rod feed being on the spindle, it is not necessary to have the screw feed reverse gearing in operation and continually wearing when operating with the rod feed. The rod feed reverse is in the apron and is so arranged that it is impossible to throw in the rod feed and the screw feed at the same time, one feed locking against the other. This is a very important point in the construction of the machine. The power cross feed and the length feed are each operated by friction discs. Either may be thrown in instantly and where it may be desirable both can be operated at the same time.

The improved geared belt feed has four changes and an adjustable tightener and by the method adopted on the "Cincinnati" make of lathes the rod feed can be operated by the screw feed gearing, and without throwing off the feed belt, by simply engaging a slip gear on the feed rod into a gear on the lead screw. This practically gives an unlimited number of feed changes. The belt feed cone pulley, as will be noticed, has but two steps, each for a 1½-inch belt, which with a set of slip change gears covered by the hood at the extreme left of the bed gives the four belt feeds mentioned. The rod feed is operated through the screw feed gearing by this slip change gear. The spindle cone pulley has five steps for a 3-inch belt and the ratio of backgearing is 10 to 1.

The compound rest and power cross feed have each micrometer adjustments by .001 of an inch. These slides are fitted with taper gibs and the handles are arranged to clear each other. The tail stock is of the improved curved, or German form, permitting the compound rest to be set parallel with the bed and feed into the center when doing short work—an impossibility with the old style tailstock. The tailstock has a continuous bearing on the Vs and a set over adjustment, the spindle is 2 3-16 inches in diameter and is bushed with bronze.

The carriage is extra long with a solid bearing its whole length on the Vs, is locked through a full length gib and is fitted with an automatic stop. It is gibbed both front and back. The bed is of extra depth and is made in even lengths from 8 feet upward. The outer Vs which receive the wear are 2 inches wide and the inner one is 1½ inches. The lathe will cut from 2 to 24 threads per inch; including the 11½ standard pipe thread. There is a swing of 21 inches over the bed, 14 inches over the carriage and with an 8-foot bed the lathe will take work 4 feet 1½ inches between the centers. The diameter of hole in spindle is 1 13-16-inch. Each lathe is fitted with compound rest, steady rest, follow rest, large and small face plates, automatic stop, wrenches and a double friction countershaft with selfoiling boxes. A taper attachment can be supplied. The weight with 8-foot bed is about 3,500 pounds.



TWENTY-ONE INCH "CINCINNATI" LATHE.

Empire Steel & Iron Co.

The Empire Steel & Iron Co. is preparing a number of its furnaces for operation as soon as the coal strike and its attendant difficulties are over, and has excellent prospects for the fall. The company has only four furnaces in blast, three Crane stacks at Catasauqua and one at Allentown, Pa. The furnace at Macungie, Pa., has been relined and the blowing engine repaired. A new blowing engine is being built at the Topton, Pa., furnace, while all of the Reading, Pa., furnaces are out of blast, one being now in course of relining. At Allentown the company has completed a new battery of boilers and one furnace is being relined and the stoves rebuilt. No. 3 furnace at Catasauqua is being rebuilt, including stoves and engine. In New Jersey the company is building a new power plant at its Oxford mines and sinking new shafts, while two large compressors and the necessary engines, boilers, etc., are being built. The furnace at that place is being relined and the stoves rebuilt, while the engine has been improved. The Mount Hope mines are being generally improved and new shafts sunk. The company's Greensboro, N. C., furnace has been relined while the engines, boiler and stoves have been rebuilt. A two-mile connection is being built to the Southern Railway at Wilson, N. C., where the company has a new ore property and it is adding a washery and other improvements.

The Diamond State Steel Co., of Wilmington, Del., has made application to the New York Stock Exchange to list $1,000,000 of 4 percent bonds of that company. These bonds were exchanged for the capital stock of the Diamond State Iron Co., which the present company succeeds. The total amount authorized is $1,750,000, but only $1,000,000 has been issued. The bonds may be redeemed at 102 and accrued interest on 60 days' notice prior to any interest period. The company has outstanding $2,250,000 non-cumulative 7 percent preferred stock and $2,000,000 common stock. A short time ago the company completed a new open-hearth steel plant at a cost of $1,000,000 which contains five 50-ton furnaces and a 34-inch blooming mill.

Blast furnace No. 6 of the Bethlehem Steel Co., South Bethlehem, Pa., has been blown in after being idle for the past six years. The scarcity of pig iron compelled the company to repair this plant and place it in operation again.

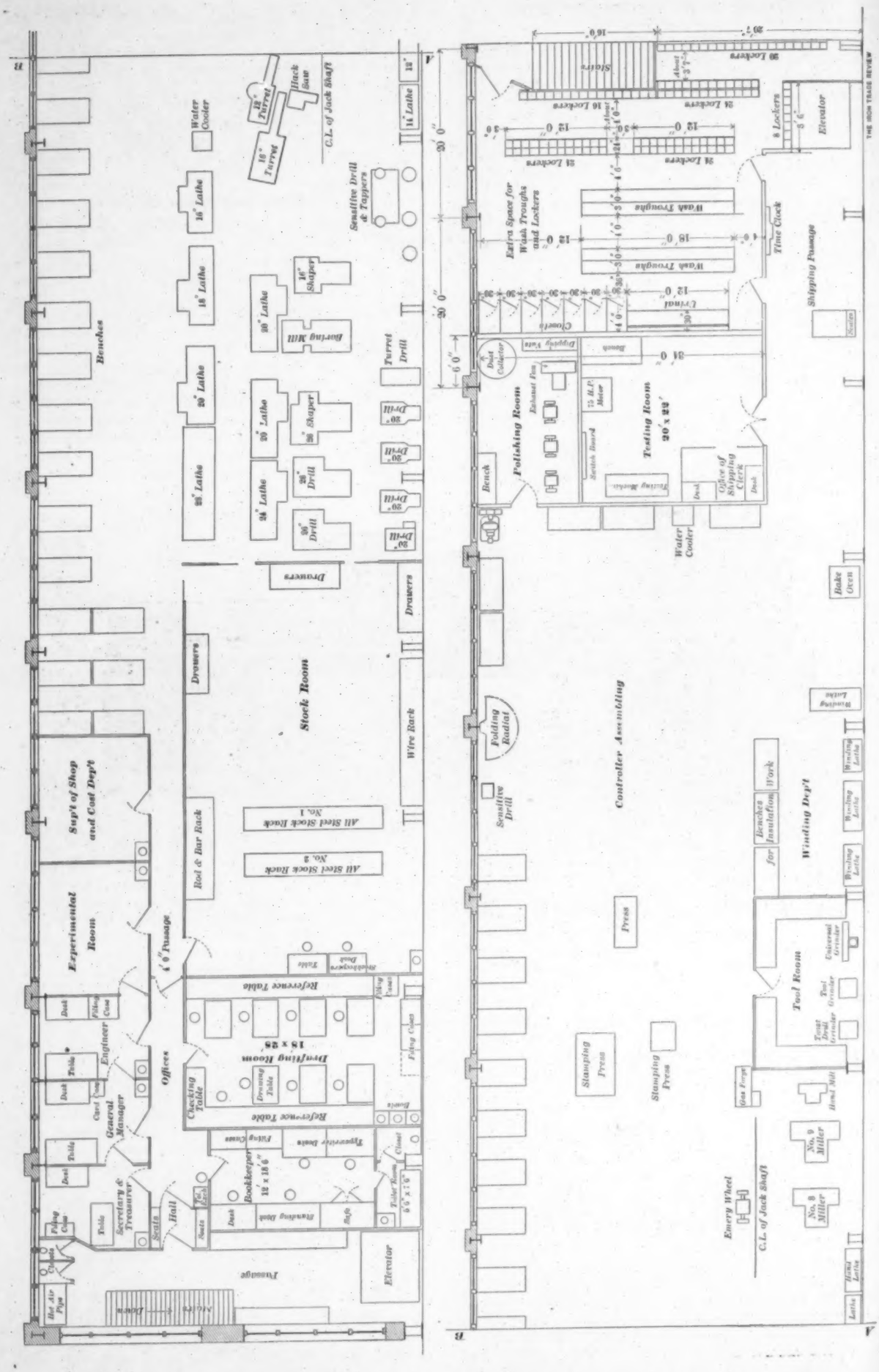


FIG. 1.—PLAN OF THE ELECTRIC CONTROLLER & SUPPLY CO.'S OFFICES AND SHOP.

The New Plant of the Electric Controller & Supply Company.

The Electric Controller & Supply Co., of Cleveland, occupies the entire third floor of the new factory building of the Wellman-Seaver-Morgan Engineering Co.'s works. Some 13,500 square feet of flour space is utilized for shop and office purposes, as seen in the accompanying plan, Fig. 1, which illustrates the layout of the equipment, etc., and is noteworthy as depicting the machine tool arrangement of a modern plant. The plan of the floor space as seen in Fig. 1 will be understood as that of but one floor; the drawing having been divided at the line A-B to avoid too great a reduction and at the same time to bring the engraving to the page dimensions.

The firm dates back to 1897 when a partnership was formed by H. McGeorge and W. W. Adams and the business was conducted by renting the working machinery, etc. The partners prospered and in January of the following year the business was moved to Michigan street. In August, 1899, the company was incorporated and C. H. Wellman was elected president; John McGeorge, vice president; W. W. Adams, secretary and treasurer and H. McGeorge, general manager. Since that time A. C. Eastwood has been added to the staff as electrical engineer.

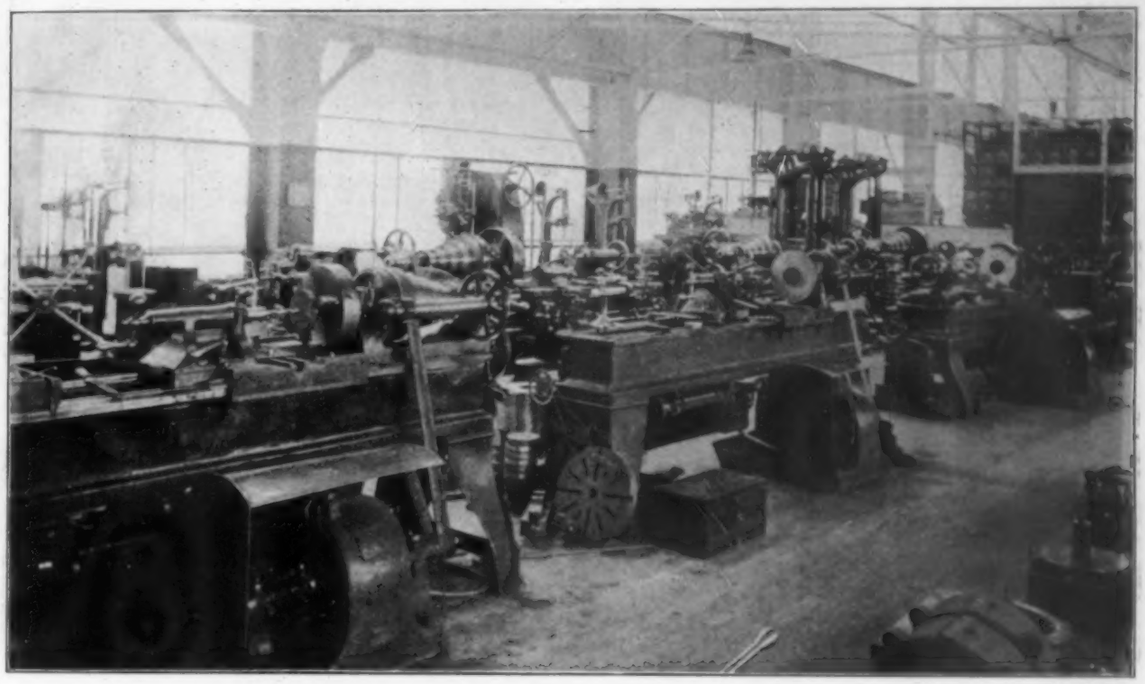


FIG. 2.—ELECTRIC EQUIPMENT OF STANDARD MACHINE TOOLS.

The company manufactures four styles of controllers: the Dinkey standard, Dinkey ventilated, type E and vertical face controllers. They also make electric friction brakes, Wellman electric stop brakes, lifting magnets of the Wellman and Clark types and a general and complete line of small electric crane fittings for switchboard work, trolleys, wire stretchers, etc.

A recent addition, a line of electrically operated friction clutches, has been made to the above list of equipment and this is being put into quite general use throughout the plant of the Electric Controller & Supply Co. as well as in that of the Wellman-Seaver-Morgan Engineering Co. The two plants as was illustrated in the case of the latter company by the article in the Machinery issue of *The Iron Trade Review* for August 7, have a most complete electrical equipment. This is shown in the case of the Electric Controller & Supply Co. by the views of the shop illustrated by Figs. 2 and 3. The company has decided upon a system of individual electric motors and those in use range from a ½ h. p. upwards. This is a wide departure from the frequently accepted rule that the separate motors should not be less than 5 h. p. and that in the instance of machines requiring less than this amount they shall be connected to a countershaft; a sufficient number of machines being driven from the one motor to call for the requisite power. With but one exception, four small drills which are belted to the one shaft and motor, all the machine tools are driven by separate motors and the adaptation of the Westinghouse equipment has been handled without regard to current practice or precedent. The shapers and planers, for example, are equipped with magnetic clutches; the planer dogs alternately operating controller switches which in turn magnetize driving discs. These discs are rotated in opposite directions by a geared motor and a floating plate, or armature clutch, between the discs may be attracted by them at the desired point where the shaper ram or planer platen should reverse its stroke. It will be noticed that the discs, and of course the motor, may be running constantly and the motion of the shaper or the planer be stopped. During the visit of the writer to the plant a 96-inch planer equipped with this device was at work. The particular job of planing was one of these annoying cuts in the bottom of a recess in the side of a frame and the cut was required to come very close to the side of the cavity at the end of the stroke. The tool was reversed promptly and safely at each stroke and when it is considered that a planer platen of this size weighs in the neighborhood of 12 tons it is evident that the arrangement works with remarkable speed and precision.

The electric motors are attached in various way to the machines. In some instances the motors have been mounted on standards above the headstock, a position that takes the electrical equipment out of the range of the grit falling from the tools, and furthermore places the easily injured parts of the motor, etc., beyond range of the careless. The accidental fall of a shaft or casting on the floor is not likely to take place from a sufficient height to endanger the elevated motor. Not all the motors are mounted in this manner, however, as in a number of instances it was though best to take the standard machine tool, cut a belt hole through the back of the bed and belt on to the armature shaft of a motor located in the rear of the lathe or other machine tool. The motors situated on the floor have been protected with a stout metal shield from falling

chips or a more substantial cause of damage. Mr. McGeorge points out that the initial outlay on the countershaft, line shafting and other incidental expenses are a substantial rebate against the first cost of the motor whilst the subsequent advantages of individual transmission are well worth the change. There is no doubting anyway that the lavish adoption of electric equipment in an establishment of this sort is an excellent advertisement and permits the exhibition of the installation as a striking object lesson in an electric system of driving machine tools. The tools are speeded by means of a controlling handle which, on the lathes for example, is carried by the carriage. A splined shaft extends the length of the bed and a bevel gear with key slides along the shaft by contact with a finger fastened to the apron of the carriage; the finger fitting into a groove turned in the hub of the bevel gear. An upright shaft with another bevel gear is operated by a handle above the surface of the carriage and the splined shaft along the front of the bed is connected with a controller system by means of two sprocket wheels and a chain. This control of the speed directly from the carriage of the lathe strikes the writer as a very useful and highly convenient addition to that useful tool and far and away ahead of the ordinary method of throwing the belt along the cones by hand.

ments. In order to allow for the changing of the elements of the rack at any time, as from a deep drawer to a shallow one, or vice versa, the figures on the uprights will be a uniform distance apart and agree with the 4-inch drawers—a system of numbering which will be equally convenient for the other sizes and allow a sufficient amount of flexibility in making any future changes.

The benches illustrated in Figs. 1 and 5 are also seen to be somewhat a departure to the ordinary practice of the shops. Each workman has his own bench and vise, the latter so placed that the workman's right is nearest to the window. On the back of each of the benches is one of these folding standards for the support of the electric light; these are of the White (Worcester) pattern, and being all metal permit the electric light to be firmly held just where the worker at the vise really needs it.

During this hot weather ice water has been a welcome convenience in the shop and in order to prevent the actual contact of the water with the ice, Mr. McGeorge has had a cooling coil of pipe arranged in a casing large enough to hold an adequate supply of ice. This is placed in the center of the shop and is a cleanly device.

The sanitary arrangements are identical with the system

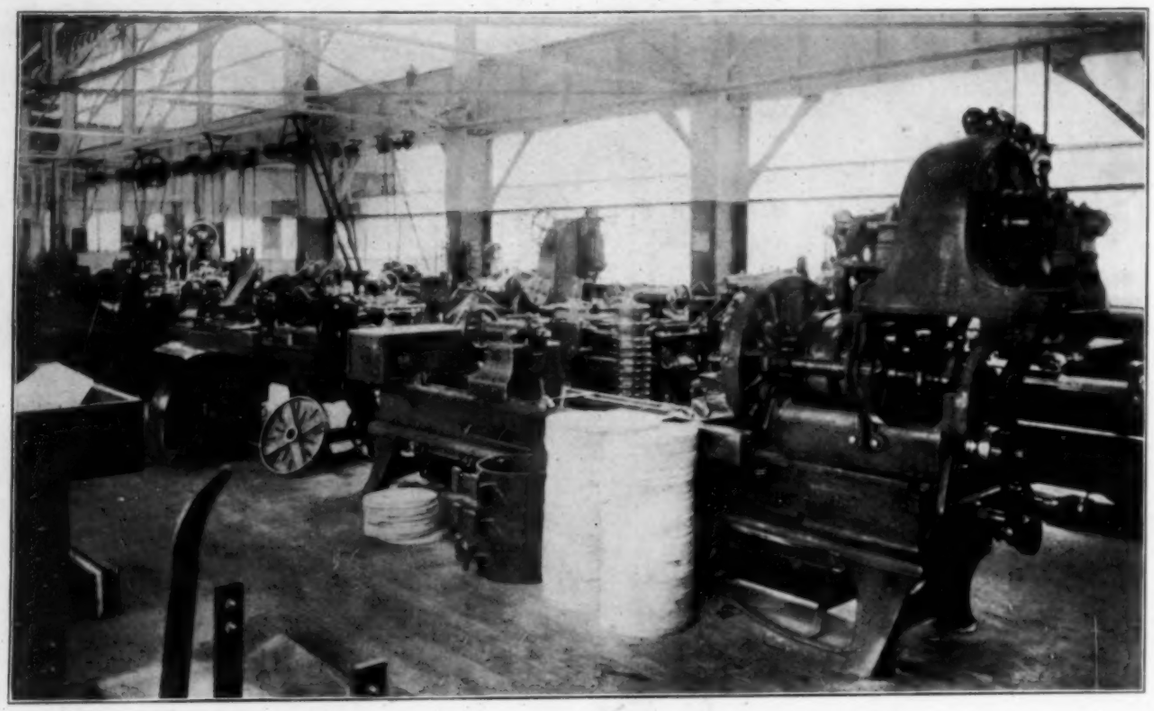


FIG. 3.—ANOTHER METHOD OF APPLYING ELECTRIC DRIVES TO MACHINE TOOLS.

Fig. 4 illustrates the storage system followed as far as possible in the stock room. This view shows one of the two sets of metal drawers and racks in use and with the multitude of small fittings found in a shop manufacturing electrical devices it is necessary to have an arrangement that will stand rough usage and at the same time be convenient to handle. The whole outfit is made of metal; angles for the uprights and slides, stout sheet stock for the drawers. The parts are drilled at regular intervals for the slides, etc., so that it is an easy proposition to change from two shallow drawers to a deep one or to take out one of the uprights and put on shelves wider than the drawers if this should be needed at any time. The drawers are 12 inches wide and are made in three depths, 4, 7 and 11 inches. From front to back of the rack is 30 inches and as the two sides are accessible the drawers may be made either 30 inches long or half that length; the shorter length of course enabling two drawers to be placed on the 30 inch slides. The manager holds that 80 pounds is a maximum load for any of the drawers, and therefore, many of the larger ones are made to the 15 inch length. A card placed in the metal pocket on the front of each of the drawers corresponds with the number of the upright (angles) separating the ele-

adopted by the Wellman-Seaver-Morgan Engineering Co. In fact the illustration of that part of the plant which appeared in connection with the article in the Machinery Issue of *The Iron Trade Review* for August was taken on the third floor of the building owing to the greater convenience for photographic purposes.

At the present time the firm employs about 110 people and the compact grouping of the machine tools, the crowded work in process of erection and the rush of business at the machines would indicate that this number is not any too large for the work in hand.

One hundred and eighty-six carloads of German steel were received in Buffalo a few days ago. The cargo was imported from Germany by William S. Sizer of the Sizer Forge Co., of Buffalo, for use at his works. The cargo weighed 3,500 tons. A large consignment of structural material for Buffalo and New York City came on the same steamer.

Among the orders received for heaters by the Stewart Heater Co., Buffalo, recently, a number came from Alaska, India, Nova Scotia and Ontario.

GERMAN IRON EXPORTS AND BOUNTIES.

Writing under date of Aug. 1 from Berlin, Consul-General Frank Mason gives an account of recent export developments in German iron and steel products, as well as the efforts of German manufacturers to secure bounties on their exports:

"The midsummer outlook for the German metal and mining

FIG. 4.—THE STORAGE SYSTEM.

industries is not so reassuring as had been confidently hoped for since the beginning of the year. The reports of several chambers of commerce, notably those from cities in busy industrial centers like Bochum, in Westphalia, have recently appeared, and in summing up the results of the fiscal year are decidedly pessimistic on one point, namely, the persistence of manufacturers in building and opening new and costly plants and steel and manufactures thereof during the first six months of the past five years shows the following striking development, the statistics being given in metric tons of 2,204 pounds:

Month.	1902.	1901.	1900	1899.	1898.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
January	282,807	147,361	116,100	126,401	120,931
February	208,604	136,720	120,755	126,193	119,898
March	238,972	173,870	127,955	135,001	146,343
April	237,827	139,953	115,969	135,572	146,527
May	268,093	187,233	134,962	126,887	143,520
June	267,440	189,377	128,483	129 376	149,909
Total	1,503,742	994 404	744.224	769,431	826,528

"There is thus shown an increase in bulk of more than half a million tons, or 51.2 percent over the exports of the first half of 1901, which were at that time the largest on record. As compared with those of 1900, the exports of the past six months have more than doubled. It is only when the fact is noticed that the increase in the aggregate values of these exports is only from 240,100,000 marks to 294,700,000 marks ($57,143,800 to $70,852,600), or 22.7 percent, that the vital fact of the situation becomes apparent, which is that a large part of this vast bulk of exports has been marketed abroad rather on the basis of a clearing-out sale, in which the goods were offered at whatever sacrifice might be necessary to secure their sale. Since, as the statistics show, the percentage of increased total values of metal exports is less than half their increase in quantity, the inference is obvious that there has been at the same time a general and substantial reduction in price. This conclusion is further confirmed by other facts of common knowledge.

A Bounty Syndicate for the Export Trade.

"Among these may be cited the action of a meeting which was called at Cologne some weeks ago, at which were assembled representatives of the coal and iron industries of Germany. The avowed purpose of the conference was to consider the general unsatisfactory condition of the home market, the persistent increase in productive capacity, and the

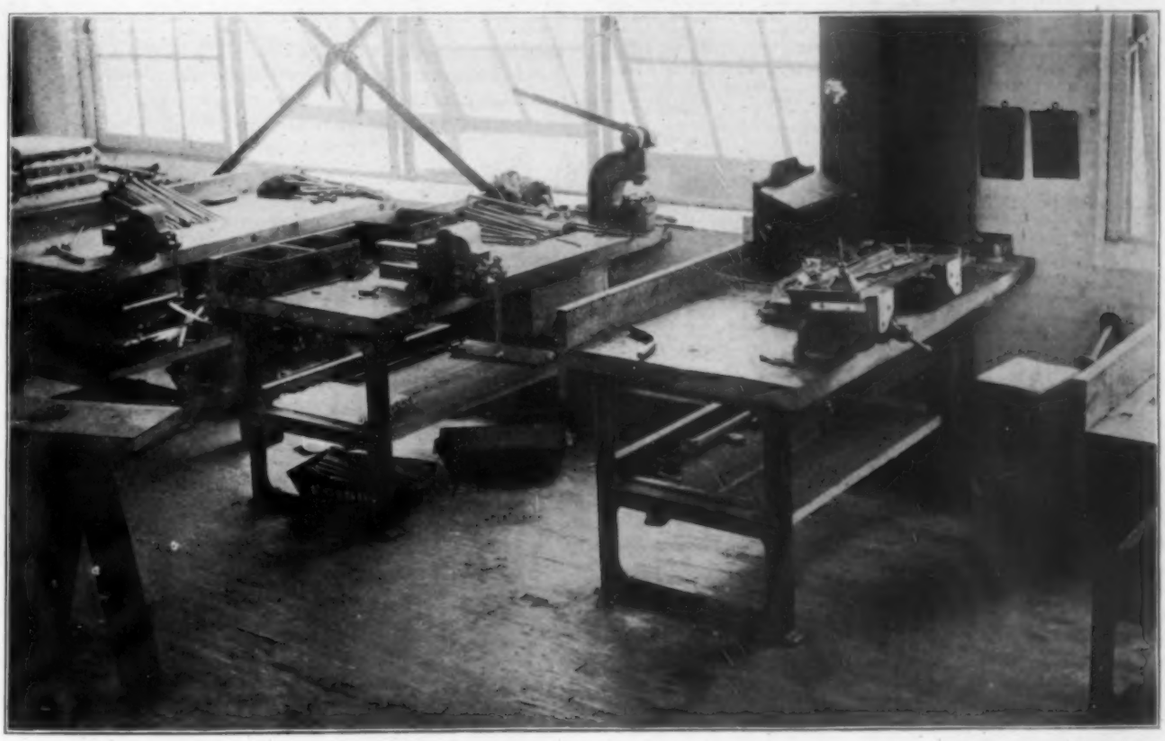


FIG. 5 —ARRANGEMENT OF WORKMEN'S BENCHES.

which will still further increase their productive capacity, at a time when the home market is overstocked with most industrial products and when prudence would dictate that the output should be judiciously reduced.

"It is true that the exports of iron and steel are enormous and steadily increasing. A comparison of the exports of iron low prices obtainable for exports. After a full discussion, it was decided that the situation demanded and justified a return to the system of export bounties which had been used with such effect in the early years of German industrial expansion. Thereupon Mr. Kirdorf, president of the Westphalian Coal Syndicate, proposed a union between the coal

and iron interests for the purpose of providing export bounties among all the leading syndicates in the metal and mining industries. This was agreed to, and the combination was formed to include the Coal Syndicate, the Coke Syndicate, the Westphalian Pig Iron Syndicate, the Siegen and the Lorraine-Luxemburg Pig Iron syndicates, the "Halbzeug" (semi-finished product) Syndicate, the Wire Drawers' Association, and the syndicates of sheet metal, girders, and structural iron, besides all analogous bodies in process of formation at the time of the meeting.

"This vast and powerful export association is based upon an agreement that its members shall contribute to pay to such members as export their products a bonus equal to the difference between the current price of the merchandise in the German markets and the price actually obtained for it abroad. Thereupon a central office for verification (Oberrechnungsstelle für die Ausfuhr) was organized and established at Cologne under the management of Messrs. Schrödter & Ottmann, who will be assisted by a third member who represents specially the coal and coke syndicates. These officers are further under control of an executive council made up of delegates from the principal syndicates, whose special functions will be to decide disputed questions which may arise in the allotment of bonuses, and propose plans as to their amount and duration. The bonuses are to be paid quarterly, and the system is dated back to the commencement of the present year, so as to cover the transactions of the past six months. They will be based on the sales made and actually exported by each member during the pending quarter, including contracts for delivery abroad during the next ensuing quarter.

"The bounties to be thus paid on exported metals are calculated upon the amounts of raw materials consumed in their production, and the ingenious schedule by which these are to be apportioned is as follows, in which the amounts of coal, coke, pig iron, and blooms is given as allowed for the production of a metric ton (2,204 pounds) of each exported finished or partly finished product:

Consumption of Coal.

Per ton of—	Pounds.
Bessemer ingots	330
Siemens-Martin ingots	770
Blooms and billets	1,300
Rails, crossings, fish plates	1,320
Rolled rods, from purchased billets	1,100
Drawn wire and wire nails	1,760
Bar iron and small sections obtained from purchased billets	770
Sheets and plates	1,540

Consumption of Coke.

Pig iron	2,420
Raw ingots	2,860
Blooms, billets, rails, large sections	2,970
Drawn wire	3,300

Consumption of Pig Iron.

Raw ingots	2,530
Blooms, billets, rails	2,640
Bar iron	2,750

Consumption of Blooms, etc.

Rods	2,330
Bar iron, sheets	2,420

Consumption of Rods.

Wire nails	2,420

"It is evident that with a combination like this at their backs, the iron and steel makers of Germany will continue to be stubborn and enterprising competitors in the markets not only of Europe, but of South and Central America, Africa, and the East."

The freight rate on nails and wire to Denver, Colorado Springs and Pueblo has been cut 50 percent. The Burlington announces a cut from 77 cents per 100 pounds to 38½ cents per 100 pounds. The rate from St. Louis and Missouri River points is 33½ cents per 100 pounds instead of 72 cents. At this season the large dealers are laying in their stocks of nails and it is believed the low rate will induce shipments of nails toward the Rocky Mountains. Dealers can save $150 a car by the open rate now offered.

A twin screw fueling steamer for use in Erie harbor has just been designed and built by the C. O. Bartlett & Snow Co., Cleveland, for M. A. Hanna & Co. The vessel is 165 feet long and 35 feet wide with a carrying capacity of 700 tons. The coal is carried in receiving hoppers or pockets, which run nearly the entire length of the vessel. A longitudinal carrier running along the bottom of the vessel receives the coal by means of gates at the bottom of each hopper or compartment.

THE CHICAGO COUNTERSHAFT.

The Chicago countershaft, familiarly known as the "Pullet," which has recently been brought out by Hill, Clarke & Co., of Chicago, includes several novel features, and is noteworthy for its simplicity. It is started or stopped merely by a pull of the cord, and is positive in action. Fig. 1 gives an idea of its general appearance, while the line cut of Fig. 2 shows the details of the mechanism.

A weighted arm, or lever is set in a bearing with just enough eccentricity so that when it is thrown over by pulling the cord, the friction disc attached to the driving pulley is thrown into

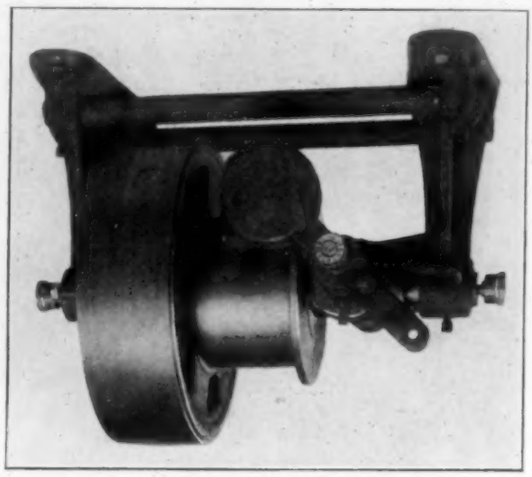


FIG 1.—THE CHICAGO COUNTERSHAFT.

engagement with its complement on the driven pulley. To stop, another pull on the cord sets the lever back to its original position, disengages the friction, and draws it back enough to entirely clear, thus preventing any wear. The contact roller which keeps the friction in gear while running, is made of sufficient size so that it does not run too fast at any time and it does not turn at all when the clutch is out. Provision is made for adjustment of the friction disc, so that the weighted lever may always act at the most advantageous angle.

Both pulleys rotate upon the shaft, which is stationary, and

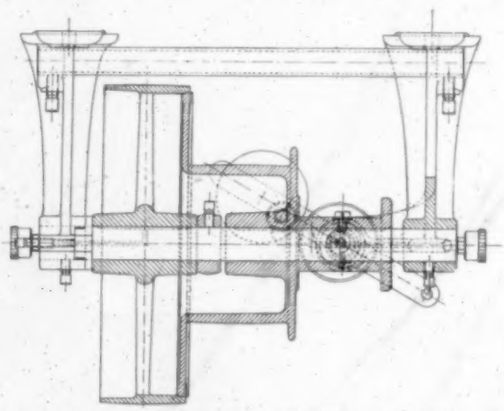


FIG. 2.—DETAILS OF CHICAGO COUNTERSHAFT.

lubrication is accomplished by holes drilled longitudinally in the shaft and these are capped with grease cups. These pulleys have a long bearing surface and are very satisfactory. The contact roller also rotates on its shaft and is lubricated in like manner. The method of mounting upon heavy pipe allows an extension to be made so that cone pulleys of several steps may be employed.

At the annual meeting of the stockholders of the Risdon Iron Works, San Francisco, Cal., directors were elected as follows: F. G. Drum, Louis F. Monteagle, A. F. Morrison, Wm. Alvord, R. S. Moore, W. H. Taylor and Augustus Taylor. W. H. Taylor was elected president, R. S. Moore vice president and Augustus Taylor secretary.

THE STEEL CORPORATION NOT A MONOPOLY.

The following interesting article is from the current issue of the *Bulletin* of the American Iron and Steel Association:

Statements having frequently been made that the United States Steel Corporation practically monopolizes the production of iron ore, pig iron, and finished iron and steel in this country, we have thought it best, once for all, to set before the public the exact facts, which will be found in the following table. With the single exception of iron ore the statistics presented have been carefully compiled from the returns of production made to the American Iron and Steel Association for the whole of the calendar year 1901 by all the constituent companies of the United States Steel Corporation, including the period prior to its organization, and by all other iron and steel manufacturing companies. The statistics of iron ore shipments and production in 1901 have been obtained from the corporation itself and from authentic data contained in our last annual statistical report. All the figures given are complete and absolutely correct; nothing has been estimated.

Iron Ore Shipments and Production in the Calendar Year 1901. Gross Tons.	By U. S. Steel Corporation.	By Independent Companies.	Total Shipments and Production.	Percentage of U. S. Steel Corporation.
Shipments of iron ore from the Lake Superior region in 1901	12,692,213	7,897,024	20,589,237	61.6
Total production of iron ore in 1901	12,692,213	16,195,266	28,887,479	43.9

Iron and Steel Actually Produced in the Calendar Year 1901. Gross Tons.	Production by Plants now of U. S. S. Corporation.	Production by Independent Companies.	Total Production.	Percentage of Plants now of U. S. S. Corporation.
Bessemer and basic pig iron	6,460 847	4,584,796	11,045,643	58.5
Spiegeleisen and ferromanganese	190,485	100,976	291,461	65.4
Forge, foundry, and all other kinds of pig iron not included above	152,656	4,388,594	4,541,250	3.4
Total pig iron, including spiegeleisen and ferromanganese	6,803,988	9 074 366	15,878,354	42.9
Bessemer steel ingots and castings	6,113,588	2,599,714	8,713,302	70.2
Open-hearth steel ingots and castings	2,746 996	1,909,313	4,656,309	59.0
Total Bessemer and open-hearth steel ingots and castings	8,860,584	4,509,027	13,369,611	66.3
Bessemer steel rails	1,719,076	1,151,740	2,870,816	59.9
Structural shapes	629,733	383,417	1 013,150	62.4
Plates and sheets, including black plates for tinning	1,456 897	797,528	2,254.425	64.6
Wire rods	1,059,859	306,075	1,365,934	77.6
All other rolled products, including bars, skelp, cut nails, open-hearth steel rails, iron rails, etc.	1,324.393	3.520,609	4,845.002	27.3
Total of all rolled products	6,189.958	6,159,369	12 349.327	50.1
Wire nails.....Kegs of 100 pounds	6,446,938	3.356,884	9 803,822	65.8

While the above table clearly establishes the fact that the United States Steel Corporation, through its constituent companies, is a producer of iron ore, pig iron, and finished iron and steel on a stupendous scale, it also just as clearly shows that it is very far from being a monopoly. We need not repeat the percentages that are given in the last column; they tell their own story.

That the reader who is not familiar with the iron and steel industries of this country may have a fairly adequate conception of their magnitude we present below a selected list of twenty-five of the largest producers of iron and steel which are in no way connected with the United States Steel Corporation and which are now operating their plants to their full capacity. A list of all the independent manufacturers would occupy too much space. At present and for some time to come this country will need all the iron and steel that the United States Steel Corporation and all the independent companies can make.

Republic Iron & Steel Co.—27 rolling mills and steel works and 7 blast furnaces; also car axle works, coal mines, coke ovens, iron ore mines, etc.

Crucible Steel Co. of America—11 rolling mills and steel works; also 3 blast furnaces and a steel plant now being erected by an auxiliary company.

Cambria Steel Co.—rolling mills, steel works, 6 blast furnaces, ore mines, coal mines, coke works, etc.

Pennsylvania Steel Co.—rolling mills, steel works, bridge-building plant, 7 blast furnaces, ore mines, etc.

Maryland Steel Co.—rolling mills, steel works, 4 blast furnaces, shipbuilding works, coke ovens, etc.

Bethlehem Steel Co.—steel works, rolling mills, forging plant, armor plate plant, and 4 blast furnaces.

Jones & Laughlin Steel Co.—rolling mills, steel works, 5 blast furnaces, chain works, ore mines, coal mines, coke ovens, etc.

Lackawanna Steel Co.—steel works, rolling mills, and blast furnaces now building at Buffalo to replace similar enterprises at Scranton.

Phœnix Iron Co.—steel works, rolling mills, bridge-building works, foundry, iron ore lands, etc.

Empire Steel & Iron Co.—10 blast furnaces, iron ore mines, coal mines, coke ovens, etc.

American Iron & Steel Mfg. Co.—4 rolling mills, 3 bolt, nut, and rivet works, etc.

Reading Iron Co.—4 rolling mills, tube works, forge and foundry departments, and 2 blast furnaces; also ore mines, coal lands, etc.

Thomas Iron Co.—10 blast furnaces and ore mines.

Lukens Iron & Steel Co.—steel works and 3 large plate mills; also coal lands.

Brandywine Rolling Mills and Viaduct Iron Works—steel works, plate and sheet mills, and tube works.

Susquehanna Iron & Steel Co.—5 rolling mills, 1 tube plant building, and 2 active blast furnaces.

Central Iron & Steel Co.—3 rolling mills (1 leased to other parties) and 2 blast furnaces.

American Steel Casting Co. (old organization)—3 steel casting plants.

Sharon Steel Co.—rolling mill, steel works, and 2 blast furnaces; also iron ore mines.

Wheeling Steel & Iron Co.—4 rolling mills and steel works, 1 tube mill, and 3 blast furnaces; also coal lands.

Colorado Fuel & Iron Co.—steel works, rolling mills, 5 blast furnaces, including 2 building, ore mines, coal mines, coke ovens, railroads, etc.

Virginia Iron, Coal & Coke Co.—2 rolling mills and steel works, 11 blast furnaces, iron ore mines, coal mines, coke ovens, etc.

Tennessee Coal, Iron & Railroad Co.—3 rolling mills and steel works, 20 blast furnaces, ore mines, coal mines, coke ovens, etc.

Sloss Sheffield Steel & Iron Co.—7 blast furnaces, ore mines, coal mines, coke ovens, etc.

Union Steel Co.—steel works and rolling mills about completed, and 2 blast furnaces building.

The Wm. Tod Co., Youngstown, O., is very busy filling orders from large manufacturing companies. Among the recent orders are the following: Three blowing engines for the Alabama Consolidated Coal & Iron Co.; same for the Detroit Iron & Steel Co.; a reversing engine for the rolling mill of the Alabama Steel Wire Co.; two reversing engines for a company at Monterey, Mex.

Hoover & Mason Ore Handling Plant at South Chicago, Ill.

At the South Works of the Illinois Steel Company, South Chicago, Hoover & Mason, contractors and engineers of excavating and conveying machinery, 1425 Old Colony Building, Chicago, have erected an ore-unloading plant, which is remarkable in many respects, having solved in new ways the problems that have been before engineers for years. These involve not only the speedy removal of ore from the hold of a vessel, but its stocking in blast furnace yard, so as to be easily accessible at any time in the year, its economical handling by means of the bin system, in connection with coke and limestone, and its continuous delivery at the top of the blast furnace. The plant at South Chicago has been in complete operation now for several months, and comprises a complete equipment for receiving the ore by water, unloading it from the vessels, stocking, and finally delivering it to the furnaces. The plant is designed to feed only the new stacks, Nos. 9 and 10, each of which has a capacity of 600 tons daily.

The prime feature of the plant is the attempt to utilize to the fullest extent the fact that these furnaces are adjacent to lake navigation, a considerable portion of the ore coming without stoppage from the mine to the furnaces. The general outline of the work, in the panoramic photograph reproduced in Fig. 1 and the sectional drawing, Fig. 2, clearly express the spirit of the arrangement. A large battery of unloaders, 15 in number, is placed at the dock front, making it possible to attack simultaneously every hatch in a large lake vessel. Each of these unloaders mounts a 5-ton grab, operated by one man, and readily makes minute trips, yielding a gross capacity in the first half of the vessel of 3,000 tons per hour. The unloaders deliver the ore into cars for shipment to distant points, or into the adjacent concrete trough in their rear. In this manner practically half of the cargo is taken out in the first hour, it being that portion of the ore subject to direct attack through the hatchways or which caves to a point beneath the hatchways in the bottom of the boat. The residue of the cargo has to be brought to a point beneath the hatchways before it can be taken out by the grabs. This work is accomplished by a system of scrapers one at each hatch operated by an engine situated upon the machine ashore, the operator of which controls the scrapers by light ropes from the hold of the vessel. The diagram of the longitudinal section of the vessel, Fig. 7, shows the residue of oer which must be scraped and brought to the hatches. The scraper itself resembles a great hoe, weighing rather over a ton. The ore is moved by alternately pulling this scraper back and forth, the point to which it returns empty being regulated by changing the position of the back lead sheave, as the plan view of the vessel, Fig. 6, shows. By these means the entire cargo is taken out without shovels. The removal of the cargo, including cleaning up and making vessel ready for another cargo has been accomplished in four hours.

The unloaders receive steam from the blast furnace boilers through a line laid in a conduit and along the dock front in a tunnel within the concrete trough construction, each unloader being flexibly connected to the main. The capacity of the unloaders, while there is plenty of ore in the hatch, is unusual; no less than 160 tons having been taken out by a single man in half an hour. The capacity in soft or hard ores, experence shows, differs but little. The various photographs clearly show the form of the structure and the grab itself.

The work of stocking the ore or transferring it direct from vessel to the great trough 600 feet long just behind the unloaders or from the stock pile to the furnace pockets is accomplished by means of two ore bridges, each 520 feet long, along which traverses an electric trolley, containing mechanism for the control of 10-ton grabs. It will be seen that each bridge commands all the various materials for the furnace burden, including a reserve stock of limestone and coke, a wise provision in the case of furnaces situated so far from the sources of these materials. Each bridge is controlled by a single operator, who can at will pick up from 10 to 15 tons and transport it in any manner desired, the hoisting speed being somewhat under 100 feet per minute. The traversing speed of the trolley is 1,000 feet per minute. The trolley loaded weighs about 125,000 pounds. Throughout its construction, street car equipment—motors, brakes, controllers—is used, two 125 h. p. Westinghouse railway motors accomplishing the digging, and two 35-h. p. Westinghouse railway motors accomplishing the transverse movement of each trolley. The current is contributed to the trolley by conductor rails situated one on each side of the truss, about 23 feet apart. Two cast iron shoe collectors are provided to each rail in order to avoid sparking under maximum demands of 900 amperes.

At each end of the truss provision is made against a runaway consisting of 12 Westinghouse friction drawheads as a buffer, which has been found quite efficient in checking this heavy trolley. These trusses rest upon standard gauge railroad tracks, placed upon concrete walls, 33 feet high. The bridge itself has a very novel function in respect to its movement, having the capacity to assume positions not necessarily at right angles to the axis of the supporting tracks. That is, one end of the truss may be kept stationary, and the other end moved 300 feet, giving an elasticity to its work highly desirable. This permits of carrying on all the operations of the furnace side of the ore yard without moving the entire bridge on its track.

The walls shown in the ore yard serve to increase the storage capacity as well as to separate the different kinds of ore, and they also have great value in preventing freezing, enabling whatever frozen crust there may be on the ore piles to be utilized as a protection against further freezing. A scrutiny of the general section of the yard readily suggests the idea that ore stocked in this form offers less exposed surface and also less floor area to clean up. Again, it will be noted that the ore taken from the stock pile will always be at the top and therefore dry. It has frequently happened that ore taken from these piles during the wet periods would appear dry, while ore taken at the same time from adjacent piles—that is, from the base of the piles—with other appliances, would appear almost in a liquid condition. The experience of the past year shows that it will rarely be necessary to take to the furnace pockets either frozen or wet ore, for the grab is in such complete control of the operator that he can choose to take only just such ore as he wants, laying aside temporarily what is either frozen or too wet.

The truss structures are riveted throughout and were manufactured by the Illinois Steel Co. at its North Works, in Chicago. The total weight of each, including the supporting cars, is about 1,000,000 pounds. The supports for each truss over the walls are as follows: On each car is a turntable, similar to a swing bridge turntable, but upon the south walls in addition, the trusses rest upon a nest of parallel rollers, which permit a variation in span length due to the obliquity resulting from the angular movement of the trusses. During the time the bridge is traversing the length of the ore yard the work of excavating and delivering the ore is not interfered with, both going on simultaneously.

Furnace Pockets.

The furnace pockets have a capacity of 3,000 tons of ore, 1,000 tons of coke and 500 tons of stone. They are double pockets, the south tier being used entirely for the storage of coke and stone, and the north tier for ore. A large part of the ore is contributed to the pockets by the ore bridges direct, but owing to the fact that the ore yard could not be placed symmetrically to the furnaces, a transfer car is also necessary. This car is of very large dimensions so that the bridge operator can forthwith deliver his load of 10 tons taken up by the grab from the trough or from the stockpile, without undue nicety of operation. The grab itself when open has a spread of 19 feet and a width of 6 feet. The skewing of the ore bridge which brings the grab to a position across the line of the axis

Fig. 3

Fig. 1.—General View of Bridge and Ore Stock Yard, with Bins and Furnaces on the Right, and Ore

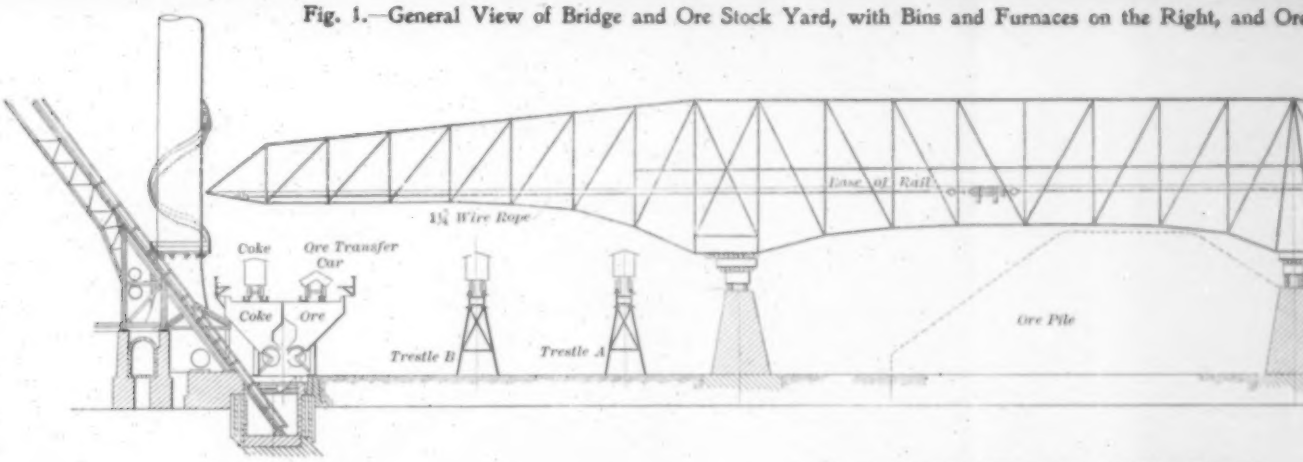
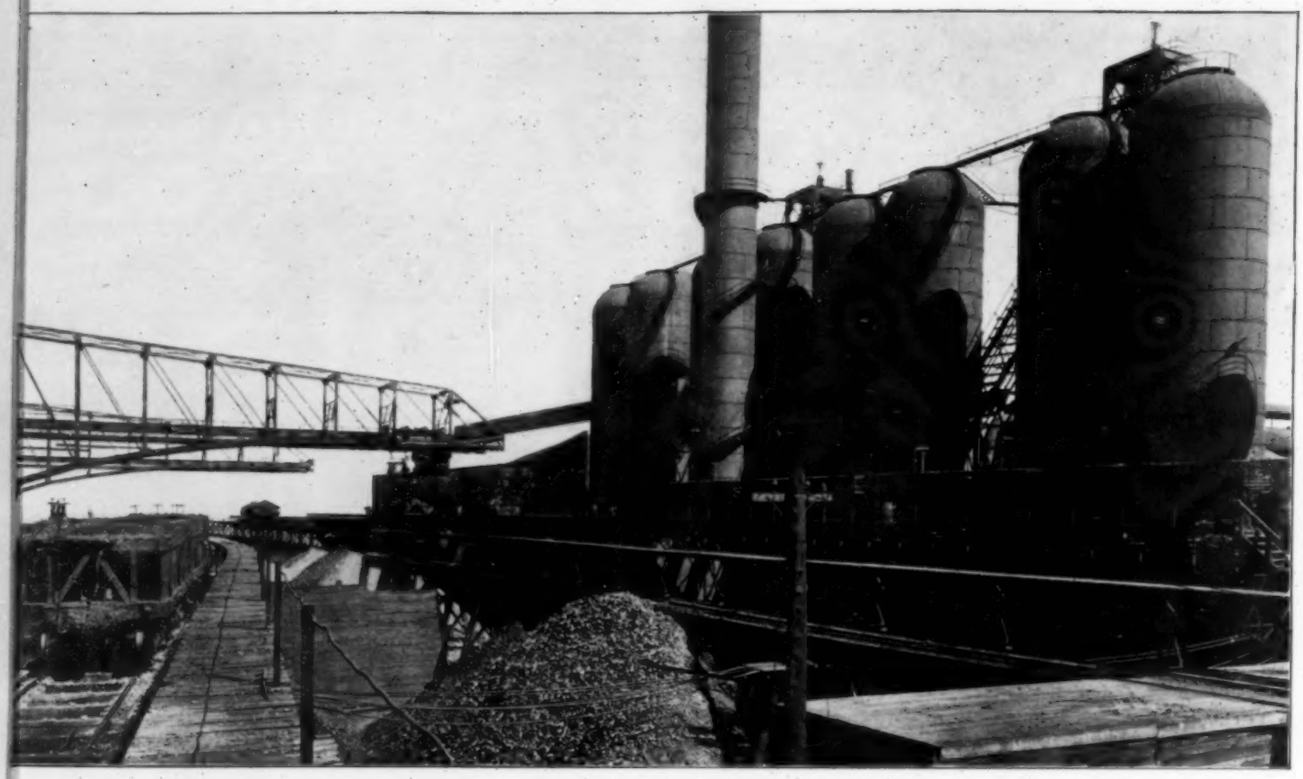


Fig. 2.—Sectional Elevation of Bridge, Trough, Unloading Machines, Vessel, Ore and Coke Bins and Ore Piles.

Fig. 3.—View of Scale Car and of Ore and Coke Bins.

Hoover & Mason Ore Handling Plant at the South Works of the Illinois Steel Co., South Chicago, Ill.



on the Right, and Ore Trough and Unloading Machinery on the Left.

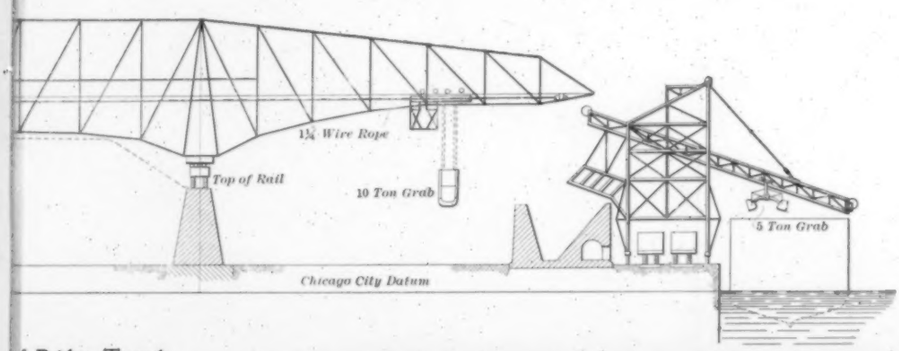
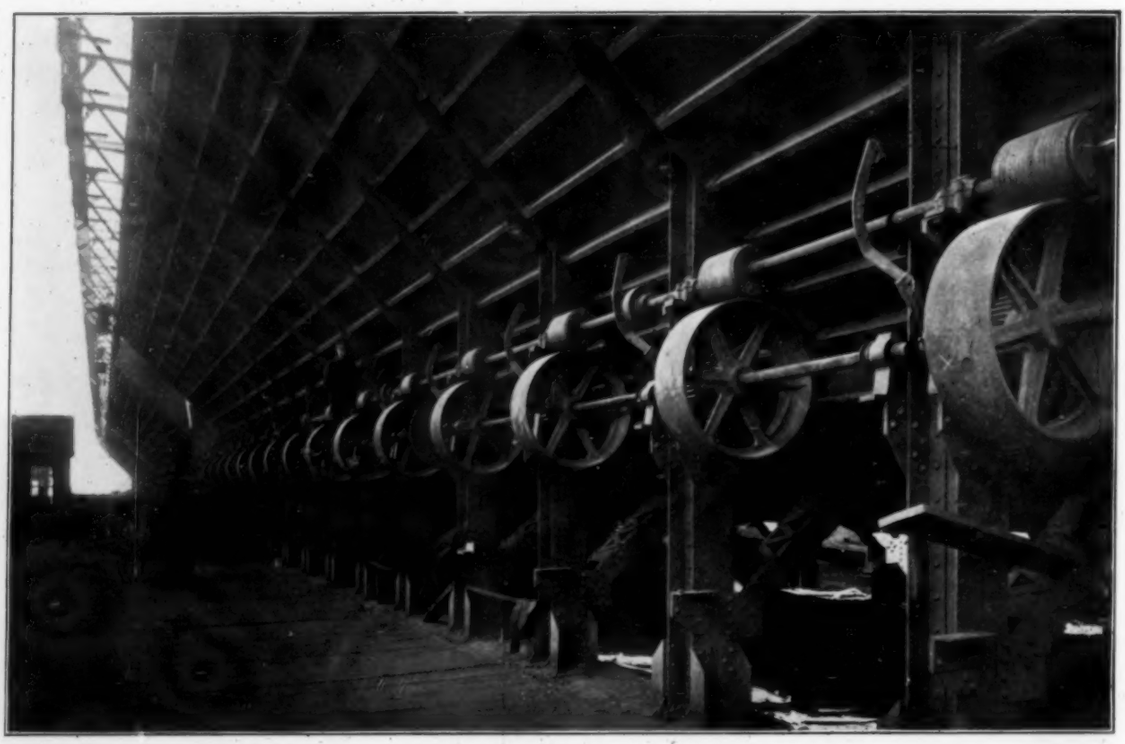


Fig. 4.—Rear View of Hoppers, Showing Mechanism by which Ore is Dropped from them into the Scale Car.

of Bridge, Trough, Vessel, Ore and Ore Piles.



Ore Handling
h Works of
Steel Co.,
go, Ill.

of the pockets, also affects the size of the car necessarily. The body of the transfer car is therefore made 26 feet long by 18 feet wide. It is a side dump car, the opening of the doors being effected by gravity, while they are closed by a small motor. The transverse movement of the car is controlled by two 35 horse power Westinghouse railway motors. The operator's cab is placed upon a sort of outrigger in the rear of the car, so that he may avoid danger from scattering lumps of ore. The size of this car permits the ore to be delivered to either side of the pocket, or into a restricted length along the pockets. The car body is extremely heavy, so that the rough usage due to its receiving increments of a mass of 15 tons is not destructive to it. The car is electrically operated by one man, who travels with it, having ordinary street car devices at his control.

The ore pockets are constructed of steel throughout and are

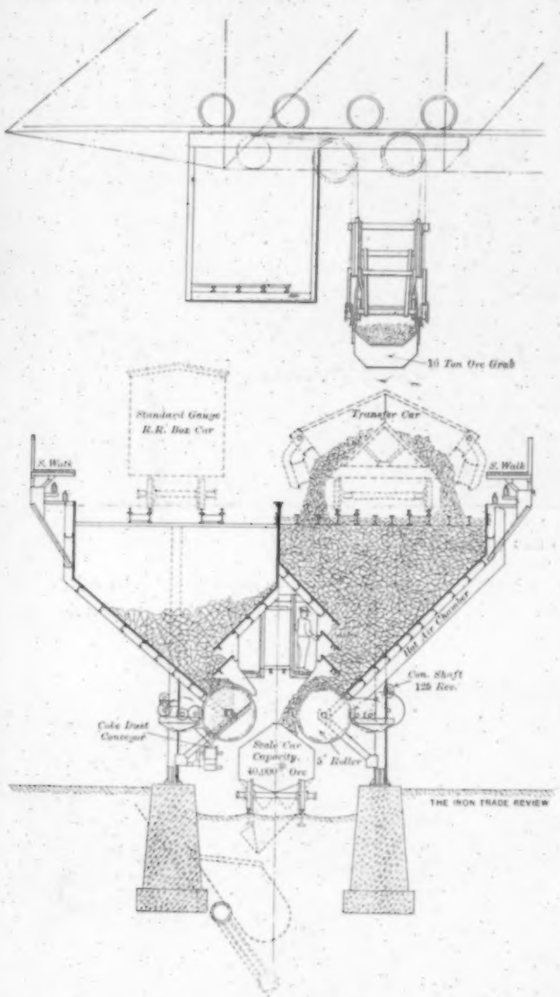
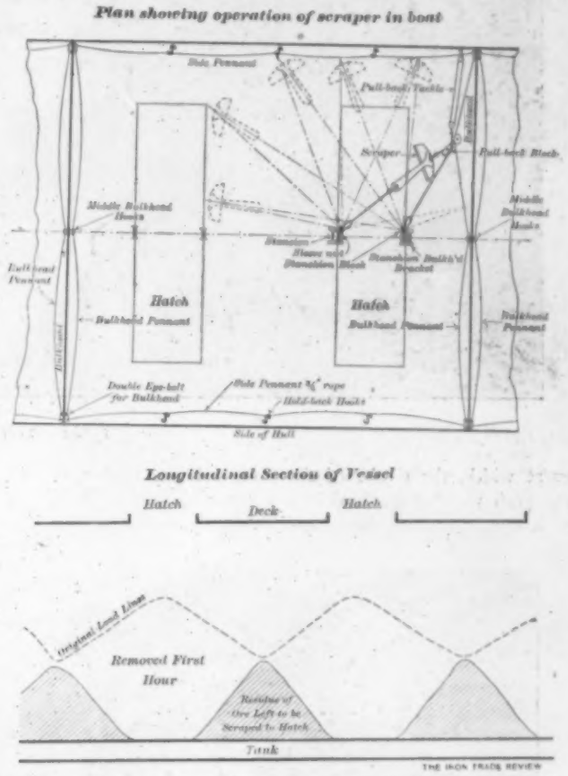


FIG. 5.—SECTIONAL ELEVATION OF ORE AND COKE BINS, ROLLS, SCALE CAR AND TRANSFER CAR, ALSO 10-TON GRAB AND END OF BRIDGE.

boldly new in design, a good deal of study having been given to their form to prevent the formation of arches in the ore mass. The sectional view, Fig. 5, shows how this is accomplished by means of louvres, which eliminate one skewback from the incipient arch in the ore mass. These louvres also afford access in the case of the few very sticky ores which, despite the louvres, have a tendency to choke. The withdrawing of ore from the pockets is accomplished by the Hoover and Mason roller, a rotating cylinder 5 feet in diameter. The aperture for the exit of the ore is in all cases equal to the width of the pocket, so that the ends of the pocket are vertical. When it is desired to withdraw ore, these rollers are actuated and form a sort of conveyor, which carries the ore out of the pocket, and to a considerable extent loosens up the mass within the pocket. These rollers are actuated by a motor-driven continuous shaft, which can at will be geared to the rollers by friction devices. The rollers on the coke side are perforated making a most efficient screen for the separation of dust from the coke. It will be seen in Fig. 5 that a hot air chamber is provided under the ore bins to prevent the troubles that arise from freezing in winter.

Scale Cars.

One scale car only is needed for each furnace. In the past year one man has kept one of these large furnaces full and without difficulty. Each scale car has two compartments each holding a skipful. All the material delivered to the furnace is weighed before entering the skip. The scale car is actuated by standard street car motors, brakes and controllers, this plan having been followed throughout the entire scheme, whenever practicable. The scale car is mounted upon a 100,000 pound Howe scale. The balancing of the beam is accomplished by a spring, and the Streeter-Amet recording devices print upon a stock-ticker ribbon the weight of each increment required to make a round, in a manner beyond the power of the operator to tamper with. By these devices an unimpeachable record is kept of everything going into the furnace. An examination of these printed ribbons show that an accuracy of 3-10 of 1



FIGS. 6 AND 7.—PLAN OF VESSEL HOLD, SHOWING OPERATION OF SCRAPER. SECTION OF VESSEL SHOWING ORE LEFT BY GRAB TO BE REMOVED BY SCRAPER.

percent is obtained by the scale car. It will be noted that the coke is distributed along a considerable length and not as customary lately, in two large ore bins delivering directly to the skip. The advantages of the plan adopted are, first, that it enables a large number of coke cars to be located over the pockets and unloaded simultaneously; second, that it obviates the drawback in these large pockets due to the accumulation of dust in the bottom, the furnace by this method not receiving too great a proportion of dust at any time; third, it is found that by putting the coke through the scale car the dust of the coke prevents ore from sticking in the car, enabling the scale car to be very rapidly discharged. The fact that a single man on this scale car is able to maintain a furnace shows that the pockets are easily actuated and rapidly deliver the ore. The scale car operator does not leave his station for any purpose. He is able to control the car or the pockets from one position, pendant cords somewhat like a bell rope being conveniently placed so that by the simple act of pulling them he can in a few seconds load his car. The load upon the car is signified by an arrow on a large dial. Buttons of different colors are placed on this dial, each button corresponding to an installment of ore, coke or stone. He pulls the cord until the index finger

travels to its proper position, when he releases it and the issue stops.

The Grabs.

The grab ore bucket is essentially different in its characteristics from the clam-shell bucket. The cutting edges open to a great width, the stroke of the same being a compound one, the grab plowing its load in a manner similar to the action of a true cutting tool. The common clam shell follows the same circular path, which renders it impractical to dig anything but soft material. In the Hoover & Mason bucket, the 5-ton grabs open 14 feet, the 10-ton grabs open 20 feet, and the path of the cutting edge through the material and the inclination of the tray follow along certain lines which are found to be most efficient for digging ore. The construction of the grab permits of this stroke being made ideal for any given material. It may be made of such a character as to take an even cut of six or eight inches below the surface over the area contained in the closing stroke, or any other depths within certain limits that the character of the material warrants.

FIG. 8.—FIVE-TON GRAB OPEN.

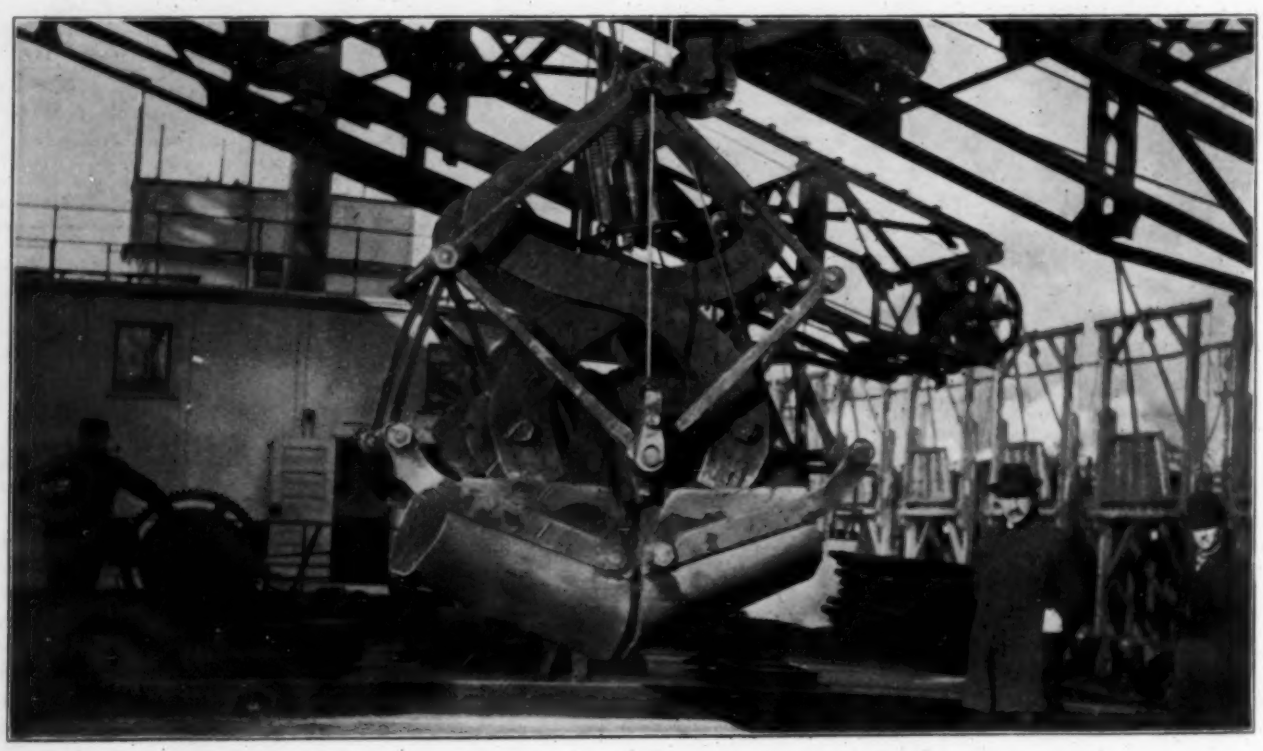


FIG. 9.—FIVE-TON GRAB CLOSED.

The Ore Trough.

The ore trough is rendered necessary by two facts. First, it is highly desirable to unload a vessel speedily, and the shorter the distance the ore is moved the more rapidly the vessel will

be unloaded. Second, the stock piles must be accessible at all times to the agent which brings the ore from these piles to maintain the furnaces. As a general rule the ore being unloaded from the vessel is only to a small degree needed during the day it is unloaded. This being the case, if the devices for unloading vessels extended over the stock yard; that is, if the 5-ton grabs had to travel from the hold of the vessel to the furnace pockets or to the stock piles much valuable time would be lost and the stocks already in the yard would not be easily accessible. The trough, therefore, gives elasticity to the unloading operation. All ore taken from the vessel's hold, except such as is immediately dropped into cars for shipment to distant points, is unloaded into the trough in the rear of the unloaders, and from thence is distributed by means of the 10-ton grabs, into the stock yard or direct into the pockets located near the furnaces. This insures the utmost speed in relieving the vessels of their cargoes and enables the 15 five-ton grabs to be constantly at work removing the ore from the vessels, while the 10-ton grabs can either be feeding the furnaces from the stock piles or removing the ore from the trough onto the stock piles.

An inspection of the operation of the Hoover & Mason ore-handling plant at the South Works gives the visitor repeated impressions of the economies possible at a plant located adjacent to the ore receiving dock. The small number of men required for the unloading from vessel, and for the subsequent handling in the yard and in and out of the furnace bin system. The engineering problems involved have been handled with a good appreciation of the demands of the situation, and the solutions, as is indicated in the views and the accompanying description, have been in a number of cases on quite novel lines. The first cost of such a plant is evidently large, but the economies of operation are pronounced.

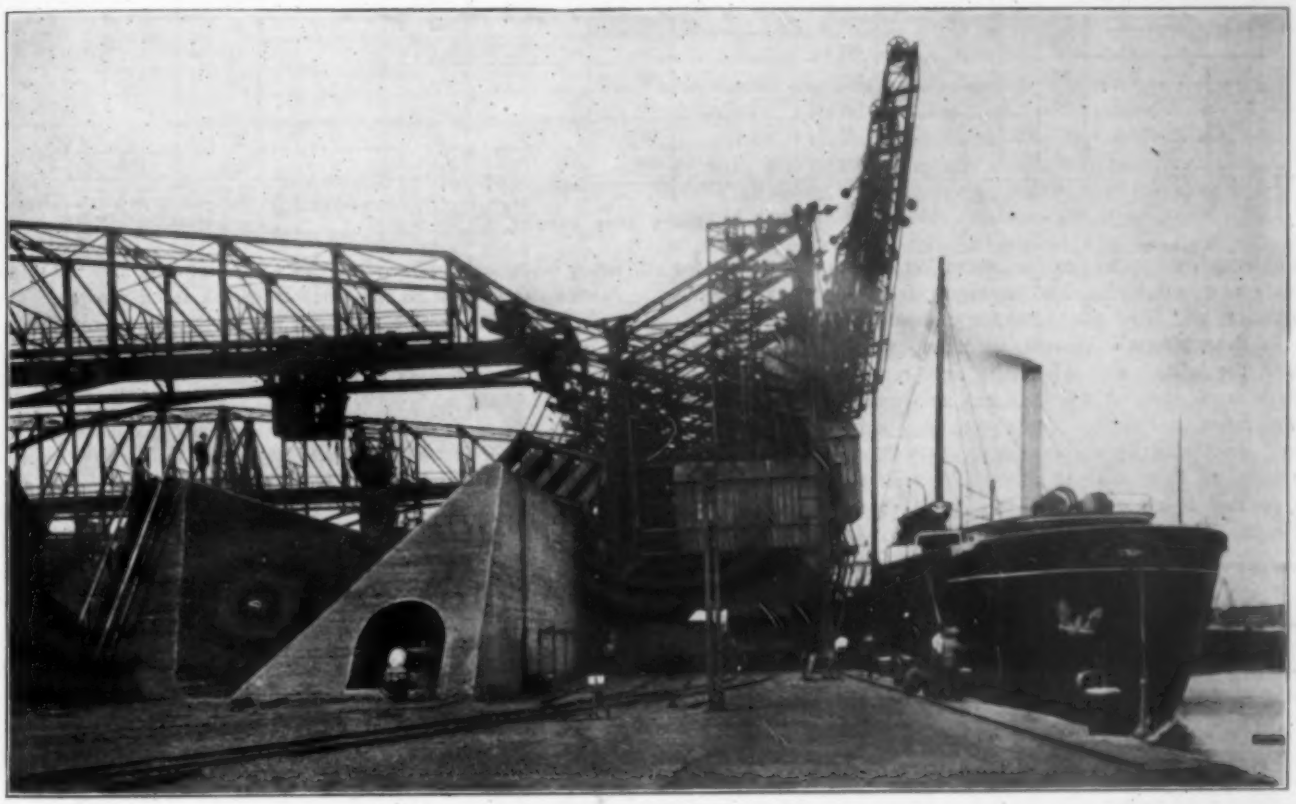


FIG. 10.—END VIEW OF ORE TROUGH AND UNLOADING MACHINES.

CENTRAL AND EASTERN PENNSYLVANIA.

HARRISBURG, Pa., Sept. 2.—The freight congestion due to the enormous amount of business and the demands on the soft coal and coke regions has caused annoyance in the iron and steel business throughout Eastern Pennsylvania exceeding the difficulties brought about by the strike in the anthracite regions. Furnaces are being banked and blown out and a number of establishments are curtailing operations. On the other hand several stacks are being prepared for early operations and a number of works will increase capacity and forces.

The Lehigh Valley furnaces show the effects of the anthracite strike and last week several were banked. Conditions in the Reading region were reported as unchanged today, half a dozen usually active stacks being idle until supplies can be improved. At Lebanon today there are three of the Lackawanna Steel Co.'s five furnaces banked on account of the failure of the coke supply and the Pennsylvania Steel Co. has had trouble to keep its two Lebanon furnaces going.

No. 2 Paxton Furnace, recently bought from the Paxton Iron & Steel Co. by the Central Iron & Steel Co., of Harrisburg, will be blown in next week and its capacity will be increased to 160 to 170 tons per day. Superintendent Amsden has installed a new battery of boilers and made a number of changes to the stack, increasing the hearth and bosh. No. 1 furnace is in blast. These furnaces are the old McCormick stacks.

The Pennsyvania Steel Co. will start Lochiel Furnace soon. It is now being repaired after a long run and has been doing very well of late.

The two Chickies Furnaces at Chickies in Lancaster county, are to be started up soon by a new company, composed of Philadelphia capital. The machinery is now being overhauled and improved, while the stacks will be made up to date in every particular.

The Lalance & Grosjean Co. is improving its tin plate mills in this city and will spend $50,000 on new electric arrangements and betterments of machinery. The works will be run regularly this winter. Another Harrisburg concern contemplating electric improvements is the Harrisburg Mfg. & Boiler Co.

The State of Pennsylvania will let contracts for 19 steel bridges on Sept. 23. The plans are to rebuild that many bridges which were destroyed by last winter's floods and over half a million dollars will be spent. T. L. Eyre is the superintendent of buildings for the State.

The attempt to operate part of the Lebanon plant of the American Iron & Steel Mfg. Co., at Lebanon, led to a strike of most of the other employes last week. The company has had a large number of men idle at Reading and Lebanon through refusal to accede to demands made last spring, and has been bringing in new men.

The hunt for steel is just as vigorous as ever and several concerns in this part of the State have contracted for large amounts of English and German steel to be delivered this fall. Where local pig iron can not be secured purchases are being made of Scotch and English iron through New York agents, several good sized sales having been made in August.

The Paxtang Electric Co., of this city, has let the contract for a half-million dollar plant to the Western Electric Co.

The old Gore foundry at Morrellville is to be enlarged.

The Newport Foundry & Mfg. Co. will rebuild its burned plant at once.

The Cost Keeping System of an Ohio Jobbing Foundry.

The foundry whose cost system is outlined in the following article employs a large force of workmen on a great variety of work. The workmen, comprising molders, coremakers, mechanics, apprentices and laborers, are enumerated on the daily time report in Fig. 1, each workman being designated by a number and his occupation of the day having an order number or numbers, to account for the time spent on that work. By way of proportion it may be pointed out that the workmen's numbers on the time report run from 1 to 75 for molders, from 75 to 100 for coremakers, from 100 to 125 for crane men, machinists and engineers, from 125 to 150 for apprentices and from 150 to 250 for general laborers.

In describing the system, we may appropriately commence with the labor cost. The daily time report is obtained by a clerk from each of the workmen and entered upon the form illustrated in Fig. 1. The sheet, of which only a fragment can readily be shown in Fig. 1, is 11¾x16¾ inches. The amount of labor both in rate of remuneration and total time expended is entered upon the daily labor report shown in Fig. 2. This sheet in the original is 17½x37¾ inches and, as in Fig. 1, it is necessary in order to insure clearness in the details to take but a small portion of the form for illustration. It will be readily understood that the columns covering the entries for "Molding, Core, Direct Labor and Cleaning" are repeated on that portion of the sheet which is omitted from the engraving. Fig 2 is a daily summary covering not only the individual labor expense, but each of the columns to the right is reserved for an account of the labor expended on any particular piece or class of work, the labor accounted for on the right of the sheet being balanced by the workmen's credits on the left. The various totals are derived from the amounts as apportioned to the different jobs and the individual labor bestowed upon the work. The original sheet from which Fig. 2 was made is 17x36 inches. Strictly speaking the engraving should show a broken line at the extreme right like the one indicating a fracture at the bottom of the illustration.

Fig. 3 is a summary of the work expended in the melting and drying departments. The sheet illustrated by Fig. 3 is 17x23 inches.

The material used is given on the form seen in Fig. 4, the items being separated by the day's requirements and the totals can be checked off in the office from the stock records. The storekeeper in sending out supplies checks the quantities required for each job and the totals for the day are transferred to Fig. 4, the amounts being apportioned to each job and duly charged against it.

Figs. 5, 6 and 7, summarize the expense accounts for the month. Each of these sheets is 8½x13 inches in the original. Fig. 5 gives the melting and core oven cost for the month and, as a basis of comparison, the expenses of the previous month, the year to date, and the preceding year are given. The manager of the plant following this cost system has little use for any method which deals in generalities and then guesses at a percentage which may or may not meet the requirements of the case. This last is of course entirely dependent upon the degree of accuracy which the man in charge wishes to attain. In this instance the average is a matter of direct calculation, the number of heats and the weight being given and the amount of labor (obtained from the itemized reports) deduced as an average for each of the products of furnaces, cupolas and crucibles.

The monthly cost sheet is submitted in Fig. 6. This form

TIME REPORT. 190

No.	Time	DISTRIBUTION	No.	Time	DISTRIBUTION	No.	Time	DISTRIBUTION	No.	Time	DISTRIBUTION	No.	Time	DISTRIBUTION	No.	Time	DISTRIBUTION
1		MOLDERS	61		MOLDERS	121		MECHANICS	181		LABORERS	241		LABORERS	301		LABORERS
2			62			122			182			242			302		
3			63			123			183			243			303		
4			64			124			184			244			304		
5			65			125			185			245			305		
6			66			126			186			246			306		
7			67			127			187			247			307		
8			68			128			188			248			308		

THE IRON TRADE REVIEW

FIG. 1.—DAILY TIME REPORT.

TOTAL LABOR

	Men's Nos.	Hours	Rate	Men's Nos.	Hours	Rate	Men's Nos.	Hours	Rate	Men's Nos.	Hours	Rate	Amount	Molding	Core	Direct Labor	Cleaning	Molding	Core	Direct Labor	Cleaning

THE IRON TRADE REVIEW

FIG. 2.—DAILY SUMMARY OF LABOR.

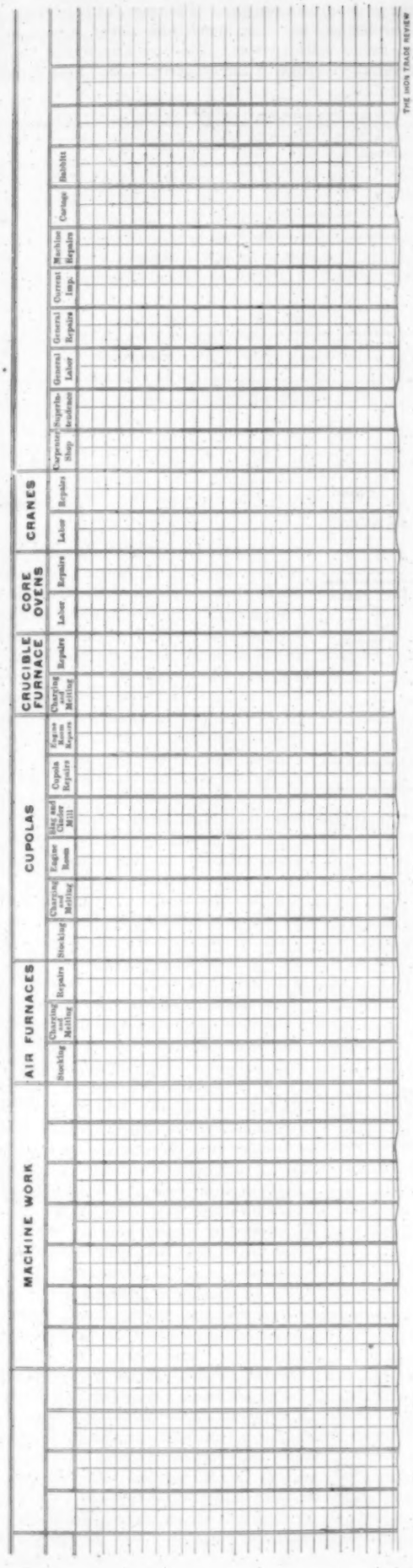


FIG. 3.—SUMMARY OF WORK IN MELTING AND DRYING DEPARTMENTS.

is arranged on the same general principles as Fig. 5. The total weight of castings is given with the number of pieces showing the average weight per piece. The line given to "Accessory Castings" refers to plates and other castings used in loam and similar work. This introduces an item which in some foundries may be of little or no importance. As a general thing the plates are easily and rapidly made, involving a minimum of skilled labor; and usually they are broken up and remelted as requiring less attention than storage and the keeping of such an account of their capabilities as would enable them to be speedily put in service whenever they may be of use. Our manager holds them valuable according to their purpose and charges the actual cost less their scrap value to the job upon which they were used. When it is desirable to retain the casting for use in the future on a new job, the cost is eliminated as they are carried only at the value of scrap iron.

The general charges for the month are treated in detail in Fig. 7. No superficial adjustment of the foundry burden is considered worth the while by the man in charge. Here the salaries of all holding positions of responsibility appear with the expenses incurred in marketing the product, handling the accounts, advertising, etc. Here also appears the itemized list of sundry expenses; this last in this case is set forth with sufficient detail to serve a far more useful purpose than the term is often employed to describe. The electrical conveniences, cranes and light, are charged from the meter readings regularly.

It will be seen that the manager of this foundry is not content with ascertaining the cost of any one casting or even a number of pieces. He has devised and applied a system which treats of the foundry and its functions in detail and compares the present and past efficiency of the plant with a careful analysis of the part played by the men and materials in the mechanical operation of the works. He has at command in tabulated form the work done by each employe; the total amount turned out daily, weekly and monthly; the manufacturing efficiency of the organization as evidenced by the percentage of defective castings, furnace losses, etc. In short, the haphazard plan of estimating on a piece of work is eliminated to a remarkable degree. Of course the new piece of work may be, and frequently is, something entirely different from the usual run of castings; but a close acquaintance with the labor possibilities of the plant through the medium of the present system is of valuable assistance in that event, while in the calculation of work regularly handled it permits a check of surprising accuracy to be kept upon the cost of the output.

Another form, which is not here illustrated, gives the quantity and character of the output of each molder as shown by the weight and number of good or defective castings, as the case may be. This individual record which is easily maintained from the other foundry forms has been useful in different ways—for instance, as a comparative check against the individual labor output. The manager states that in dealing with the men it has been of great value to take out the record book and let the molder see that his work has not been lost to view but has been constantly and keenly scrutinized by those in charge. There is a natural curiosity to learn how the office record of a workman's labors agrees with the personal impression and the system has occasionally proved well worth the trouble taken with the tabulation.

The costkeeping method as here outlined is maintained in conjunction with a series of excellent forms for shipping and similar purposes. It has seemed best to restrict the present article solely to the matter of cost accounting and in this particular the scope and detail of the system will be worthy of careful investigation.

Frank B. Baird, formerly of the Hocking Valley and later of the Buffalo Furnace Co., at Buffalo, has purchased for $28,500 the Martel Furnace at St. Ignace, Mich., in conjunction with Cleveland interests. Mr. Baird operates the East New York mine at Ishpeming, Mich., and a portion of the ore for the blast furnace will come from this property. The Martel Furnace produces charcoal iron and is one of the Michigan stacks which have been regarded as permanently out of blast. Arrangements have been made for a supply of charcoal and it is expected the furnace will start up after repairs. The product will be sold by M. A. Hanna & Co., Cleveland.

LAKE SUPERIOR IRON MINES.

The mining lease on the n ½ and the sw ¼ of the ne ¼ section 6, T. 57, R. 20, comprising what is called the Webb mine, has been sold by the Fay Exploration Co., which had the exploring lease, to the Oliver-Snyder interests for a bonus, said to be $280,000. The tract contains considerable ore and figures up at 2,000,000 tons of 60 percent. With the percentage reduced to 58 percent the total tonnage is twice as much, and with the percentage still further reduced to 56 percent the tonnage is about 6,000,000 tons. The tract has been fairly well explored and ore has been found there under more than 100 feet of rather solid taconite. The Fay Exploration Co. had to deliver the tonnage of the property to the Great Northern road under a binding contract. The fee to this tract is in M. H. Alworth, of Duluth; M. D. Hull and sister, of Chicago, and the Boeing estate, of Detroit, Mich., each one-third, and the rayalty is 26 cents a ton with an annual minimum of 100,000 tons. The land was taken by the fee owners for pine alone and the later discovery that it was on an iron bearing formation was a surprise to the owners. Mr. Alworth was an explorer and got his third interest for selecting the land for the others. An immense amount of land in the Hibbing district is held by Alworth, Hull & Boeing.

The Minnesota Iron Co. (U. S. Steel Corporation) is opening a tenth mine in the Hibbing (Mesabi range) district. It is to be called the St. Clair and is located on the se ¼ of the nw ¼ of section 23, T. 58, R. 20, the town that is furnishing the finest ore on that range. The St. Clair was bought in fee a year or more ago from Messrs. Congdon and Hartley for something more than $400,000, the exact sum being based on what ore might thereafter be found. The company is now operating in the Hibbing district the Hull, Rust, Burt, Day and Sellers, at Hibbing village, and the Pillsbury, Glen, Clark and Chisholm in sections 29 and 28, T. 58, R. 20. It will mine there this year not far from 2,000,000 tons, and is moving some stockpiles that have been on the ground for five years, notably from the Day. This last ore, though excellent chemically, is rather fine in physical structure. The company is erecting at Hibbing a fine large two-story office building and laboratory and all its operations in the district are under the supervision of Pentecost Mitchell, a well posted and thoroughly competent mining manager. At the Burt a large amount of stripping is being done to open all the northern part of the property. The present contract is for about 400,000 yards, but it is the intention to more than double this later and to strip well up to the north line, one-half mile north of the village limits. Estimates are being made for an immense stripping job at the Hull, which may be undertaken next year. This lies adjoining the Mahon-

Material Used in _____ Week Ending _____ 190__

	PITTSBURG SAND.	MASSILLON SAND.	SHARP.	SILICA ROCK SAND.	BLACKING.	COAL FACING.	X. X. FACING.	FLOUR.	MOLASSES.			
SUNDAY,												
MONDAY,												
TUESDAY,												
WEDNESDAY,												
THURSDAY,												
FRIDAY,												
SATURDAY,												
TOTAL,												

Signed, _____

THE IRON TRADE REVIEW

FIG. 4.—WEEKLY LIST OF MATERIAL.

Melting and Core Oven Cost for Month of _____

AIR FURNACES.	THIS MONTH		LAST MONTH		TO DATE		LAST YEAR
	Heats AMOUNT	Lbs. AVERAGE	Heats AMOUNT	Lbs. AVERAGE	Heats AMOUNT	Lbs. AVERAGE	Heats Lbs. AVERAGE
Labor Stocking,							
" Charging & Melting							
Fuel,							
Air Furnace Repairs,							
Total,							
Average Cost per Heat,							
CUPOLAS.	AMOUNT	Lbs. AVERAGE	AMOUNT	Lbs. AVERAGE	AMOUNT	Lbs. AVERAGE	Lbs. AVERAGE
Labor Stocking,							
" Charging & Melting							
" Engine Room,							
" Slag and Cinder Mill							
Limestone,							
Cupola Fuel,							
Boiler Fuel,							
Cupola Repairs,							
Engine Room Repairs,							
Total,							
CRUCIBLE FURNACE.	AMOUNT	Lbs. AVERAGE	AMOUNT	Lbs. AVERAGE	AMOUNT	Lbs. AVERAGE	Lbs. AVERAGE
Labor Charging and Melting,							
Fuel,							
Repairs,							
Total,							
CORE OVENS.	AMOUNT		AMOUNT		AMOUNT		
Labor,							
Repairs,							
Fuel,							
Total,							

THE IRON TRADE REVIEW

FIG. 5.—MONTHLY OUTLAY ON MELTING AND CORE OVEN.

ing to the south and is a very large deposit. There is a surface up to 60 feet thick. The company will buy a number of large shovels and will do most of this work without the aid of contractors.

As to stripping on the Mesabi: It is now found advisable to take off a much greater depth of earth overburden than formerly. This is on account of the increased cost of mine labor and the scarcity of timber. Probably much the deepest stripping ever taken off an iron mine is at the Fayal, where the milling pit, to the west of No. 3 shaft, is stripped of earth up to 80 feet thick in some places. Smaller ore bodies are stripped than formerly. The Jordan, in section 27, T. 58, R. 20, is a case in point. The amount of work to be done on the Mesabi range has brought in numerous new contracting firms, heretofore employed almost exclusively in railway work, so that where there were six months ago but two large concerns employed on the range there are now half a dozen. This will have a tendency to decrease the cost of earthwork and increase the number of properties that can be economically stripped.

COST SHEET for Month of .....

	THIS MONTH		LAST MONTH		TO DATE		LAST YEAR
	No. Pcs. Avg. Lbs.		No. Pcs. Avg. Lbs.		No. Pcs. Avg. Lbs.		No. Pcs. Avg.
	AMOUNT	AVERAGE	AMOUNT	AVERAGE	AMOUNT	AVERAGE	AVERAGE
MATERIAL							
Metal,							
Furnace Loss,							
Bad Casting Loss,							
Melting,							
Gates and Scrap Loss,							
Total,							
DIRECT CHARGES							
Molding Sand,							
Core Sand,							
Brick,							
Accessory Castings,							
Core Oven Cast,							
Total,							
MOLDING AND CLEANING							
Molding Labor,							
Core, "							
Direct "							
Cleaning "							
General "							
Total,							
SPECIAL CHARGES							
Machine Work,							
Defective Loss,							
Special Expense,							
General Charges,							
Total,							
Total Cost,							
Operative Labor,							
Total Hand Account,							
	POUNDS	Per Cent.	POUNDS	Per Cent.	POUNDS	Per Cent.	Per Cent.
Good Castings,	Lbs.		Lbs.		Lbs.		
Furnace Loss,	"		"		"		
Bad Castings,	"		"		"		
Gates and Scrap,	"		"		"		
TOTAL CHARGE,	Lbs.		Lbs.		Lbs.		

THE IRON TRADE REVIEW

FIG. 6.—COST SHEET FOR THE MONTH.

Reports from the Helen mine of the Clergue syndicate, located near Michipicoten, Lake Superior, are not the best and it is not at all probable that the mine will ship as much ore as has been talked of. But diamond drill and shaft work elsewhere in the same general region, which is almost exactly similar to the Vermillion range in geology, is showing up a couple of properties that give great promise of importance for the manufacture of Bessemer steel. One of these is on the line of the road to the Helen, and is called the Josephine; the other is in another section, but is geologically like the Josephine. At both drill samples give excellent promise of large bodies of good ore.

Very slow progress is the result of the careful and elaborate preparations at the Maas mine in Negaunee. The heavy shaft is not moving perceptibly, but it is believed that it is resting now very close to the clay and that success will be attained soon.

It is supposed that the Duluth, Missabe & Northern road, of the steel corporation, will lead in shipments this month. It was at the top in July also. It will probably handle about 920,000 gross tons in August. This was surpassed by the Duluth & Iron Range in August, 1901, but never by any other road. Last year the Duluth & Iron Range led the D. M. & N. by more than 1,000,000 tons. This year the situation will be nearly reversed.

The stock of the Antoine Ore Co., of Iron Mountain, Mich., has been purchased by the Republic Iron & Steel Co. in conjunction with the Shenango Furnace Co., of Sharpsville, Pa. The two companies will have equal holdings and the ore properties purchased, which are located at Iron Mountain, Mich., will be operated as consumers' mines and not for the market. The mines included are the Traders', Clifford and Keel Ridge. The ores are well known for their high silica and low phosphorus and have been shipped to the extent of 618,000 tons in the past seven years. The analysis for 1901 averaged 40.93 in iron, .017 in phosphorus, 38.65 in silica and 2.64 in moisture. It is understood that the same purchasers have also acquired the property of the Vulcan Silica Ore Co., which adjoin the mines mentioned above. The transfer took place on Sept. 1. Oglebay, Norton & Co., Cleveland, are sales agents for the Clifford ore.

The Deering Harvester Co., lessee of the Hawkins mine, southwest of Hibbing, Minn., has awarded a contract for stripping 1,250,000 cubic yards of material at the property. This contract will be one of the largest of the kind on the Mesabi. The Hawkins mine is to be operated both as an underground and an open pit proposition. The work of shipping from the open pit will not begin until next spring, but shipping from underground will begin as soon as the Great Northwestern spur is built to the mine.

At the Forest Mine of the Oliver Iron Mining Co., Menominee range, an important find of high grade ore has been made. Supt. Kruse says that a stock pile analysis gives 66.40 percent iron and .014 phosphorus. He thinks he is now at the point of the ore body and the results are very encouraging. The mine is very wet, the amount of water handled being about 1,600 gallons per minute.

The United States Steel Corporation, through its mining division, is giving extensive orders for additional facilities for next year's mining operations. Twelve 90-ton steam shovels are being ordered, at an aggregate cost of $1,000,000. New hoisting machinery and boilers to the value of $125,000 have also been ordered.

The Queen mine, one of the Oliver Mining Co.'s Regent group, at Negaunee, caved in a few days ago. The hole is about 75 feet wide, 200 feet long and 100 feet deep. No one was injured and the property was not damaged in any way.

Wm. James, who has been doing some prospecting for Corrigan, McKinney & Co. for the past two months, has discovered some good ore at the foot of the hill a short distance south of the Lincoln shaft, on the Lincoln property, Menominee range. Prospecting has been carried on there before and it

was in one of the old test pits which Mr. James sunk ten feet deeper, that he made his recent find. Samples of the ore showed by analysis 54 to 64 percent iron.

There is increased activity at the Millie mine, between the Chapin and Walpole mines, on the Menominee range. It is the expectation to ship about 25,000 tons for this season with an enlarged output another year. This ore will average in cargo lots 41 percent in iron, .025 in phosphorus and 35 in silica. A new exploratory shaft will be sunk. It will be 6x12 feet inside the timbers. It will be carried down 800 feet before doing any cross-cutting unless some ore should be found at a lesser depth. Nothing is being done in the old working and nothing will be done.

The iron lands recently sold by the Mesabi Central Land Co. to A. S. Potter and H. P. Jennings, representing a Pittsburg syndicate of capitalists, embrace 39 forties in sections 13, 14, 22, 25, 26 and 29, 58-19; 11, 18 and 19, 58-18. Exploration of these lands has already commenced under the supervision of John Helmer.

General Charges for Month of .....

	THIS MONTH. AMOUNT.	LAST MONTH. AMOUNT.	TO DATE. AMOUNT.
Office Expenses,—Salaries,			
Office Expense,			
Postage, Teleg. and Teleph.			
Advertising,			
Selling Expense,			
Total,			
Sundry Expenses,—Taxes and Insurance,			
Water and Ice,			
Electric Lighting,			
Heating,			
Internal Revenue and Int. and Discount,			
Laboratory,			
Switching,			
Cartage,			
Current Improvement,			
Total,			
Cranes,—Labor,			
Power,			
Crane Repairs,			
Total,			
Carpenter Shop,—Labor,			
Lumber,			
Supplies,			
Total,			
Superintendence,			
General Labor,			
General Repairs,			
Molders Supplies,			
General Supplies,			
Total,			
Total Charges,			

THE IRON TRADE REVIEW

FIG. 7.—GENERAL CHARGE SHEET FOR THE MONTH.

An undivided 1-16 interest in the Stevens mine near Buhl, Minn., has been sold to Roswell H. Palmer and Mrs. Mary E. Palmer, of Duluth, for $25,000. The sale and conveyance was made by Thomas A. Merritt, president, and N. B. Merritt, secretary of the Interstate Mining Co., and Albert C. Hubbell. The Stevens mine is under lease to L. W. Hill, of the Great Northern, and the lease carries a royalty of 25 cents a ton, with a minimum annual output of 100,000 tons. The ore deposit measures over 3,000,000 tons of the high-grade ore characteristic of that locality. The mine was under development during the early part of the year, and it will be operated underground, the surface having an average depth of 100 feet. One of the drill holes gave the ore body a depth of 259 feet.

The strike of the machinists employed by the Pennsylvania Engineering Works, New Castle, Pa., has been declared off and the men have returned to work. The strike started about 3 months ago, the machinists asking for an advance in wages amounting to 10 percent. The company offered to settle at a 5 percent advance but this the men refused. The trouble was adjusted last week on this basis.

The following is a partial list of the engine sales of the Allis-Chalmers Co. for July: L. T. Williams & Sons, New York, 22x42-inch 1890 frame Reynolds Corliss engine; G. A. Bergland, Milwaukee, Wis., 20x42 1890 frame Reynolds Corliss engine; Owosso Casket Co., Owosso, Mich., 18x42 girder frame Reynolds Corliss engine; Buffalo & Susquehanna Iron Co., Buffalo, N. Y., four pairs of vertical cross compound steeple type blowing engines, steam cylinders 42 and 80x60, air cylinders, 87 and 87x60; Studebaker Bros. Mfg. Co., South Bend, Ind., 32x12 independent air pump and condenser; Thos. Kent Mfg. Co., Clifton Heights, Pa., one 84x18 Reynolds vertical boiler; Rock Plaster Co., New York, 22x42 girder frame Reynolds Corless engine; Madero & Rincon Gallardo, Lages, Mixico, 14x36 girder frame Reynolds Corliss engine, 14x12 air pump and condenser; John M. Stone Cotton Mills, Starkville, Miss., 18x48 1890 frame Reynolds Corliss engine; Milwaukee Electrical Ry. & Light Co., Milwaukee, Wis., two vertical cross compound direct coupled engines, cylinders 28 and 60x48 (fourth order); Combination Rubber & Belting Co, Bloomingfield, N. J., 20x42 1890 frame Reynolds Corliss engine; Springville Mfg. Co., Rockville, Conn., 14x36 girder frame Reynolds Corliss engine; Lidgerwood Mfg. Co., New York, 18x36 1890 frame Reynolds Corliss engine; Tonawanda Iron & Steel Co., North Tonawanda, N. Y., one vertical long crosshead type blowing engine, cylinders 42 and 84x60; American Steel & Wire Co., Pittsburg, Pa., six pairs of vertical cross compound steeple type blowing engines, steam cylinders 46 and 86x60, air cylinders 87 and 87x60, two vertical low pressure long crosshead blowing engines, cylinders 80 and 87x60; Brunswick-Balke Collender Co., Chicago, 26x48 1890 frame Reynolds Corliss engine; C. A. McDonald, Chicago, two 1890 frame tandem compound Reynolds Corliss engines, cylinders 14 and 26x42; Keye Brothers, Argyle, Minn., 10x30 girder frame Reynolds Corliss engine; Barnet & Record Co., Minneapolis, Minn., 20x42 girder frame Reynolds Corliss engine; Cashier Mining & Milling Co., Breckenridge, Col., 18x36 girder frame Reynolds Corliss engine; McCormick Harvesting Machine Co., Chicago, vertical cross compound direct connected Reynolds Corliss engine, cylinders 15 and 32x36; Griffin Wheel Co., Chicago, 16x42 1890 frame Reynolds Corliss engine.

The plow works of the Parlin & Orendorff Co., Canton, Ill., have been shut down for an indefinite period. The men employed in the plant recently went on a strike to enforce the annullment of a contract which permits the company to hold back 10 percent of their wages until July 1, 1903.

The Buffalo, Rochester & Pittsburg R. R. will spend about $100,000 during the next few months in enlarging its ore docks on Blackwell Island, Buffalo.

NEW MODEL UNIVERSAL MILLING MACHINES.

The Becker-Brainard Milling Machine Co., of Hyde Park, Mass., has placed upon the market a new line of plain and universal milling machines from new designs and patterns. These machines embody many new features, special attention being given to strength, power, and rigidity in order to meet the demands of modern milling machine practice. In the universal machine, the spindle is connected with the change feed mechanism by a train of three spur gears, thereby eliminating the usual feed pulleys and belt, giving a positive gear drive necessary for heavy and rapid cuts.

The new model is illustrated in Fig. 1 and the positive feed mechanism seen at the left of that view is shown with greater clearness in the enlarged engraving given in Fig. 2. The reference letters in each half-tone are the same for identical parts. This change feed mechanism is a novel feature and avoids loss of time in changing gears as was formerly the practice in the old style machines. The feed is obtained from the main spindle through a train of three spur gears on the back of the lower side of the feed box being then moved to the hole marked "SLOW," Fig. 2, and the desired speed is obtained. Should it be desired to increase the feed, lever A is moved so as to point to the line at 3 prime (marked with dash below the figure) on the index plate and .019 is obtained; if the feed is to be decreased, the lever B is moved to notch 4 on quadrant C and .013 is obtained.

When the fast feeds are desired, the quick change lever D is thrown into the hole marked "FAST" and the same operation performed as described above.

The power is transmitted from the change feed mechanism through the telescopic shaft connecting, by gears, the longitudinal, transverse, and vertical feeds, which are reversed by a lever on the side of the knee within easy reach of the operator. Both transverse and vertical feeds are operated and controlled by a lever, located on the side of the knee, which, when central, disconnects both feeds and when thrown into position for one feed it is impossible to connect the other.

Another important feature is a clutch arrangement enclosed in the hubs of the hand wheels which operates the vertical

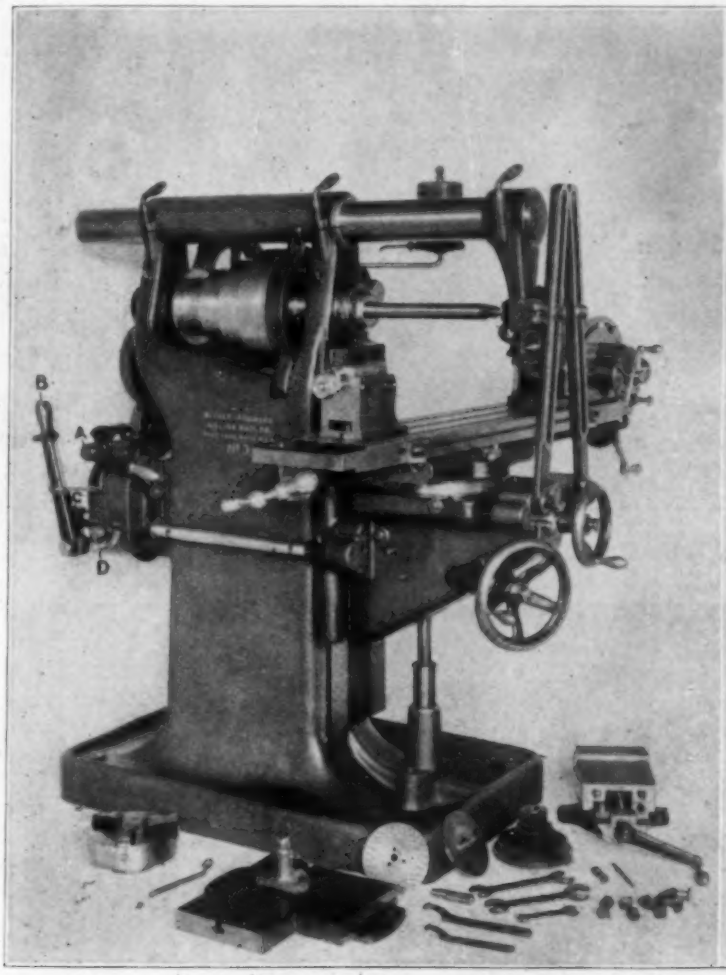


FIG. 1.—THE BECKER-BRAINARD MILLING MACHINE CO.'S NEW MODEL.

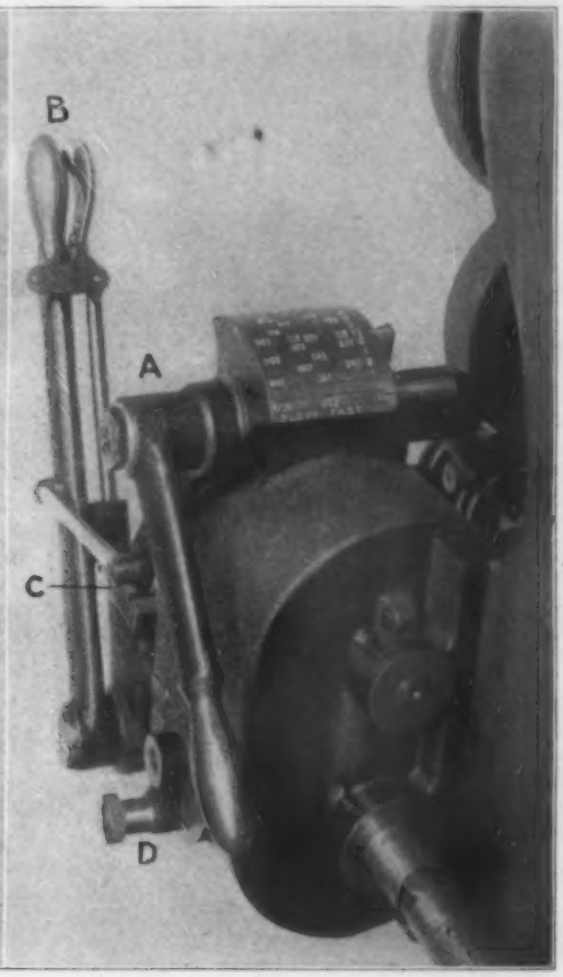


FIG. 2.—THE BECKER-BRAINARD POSITIVE FEED MOTION.

machine which drives two nests of change feed gears in the column. The various changes of feed are secured by compounding the gears in the upper nest, giving, with the quick change in the gear case on the outside of the machine, twenty changes of feed for each spindle speed. Levers, operating the change feed mechanism, are conveniently located on the side of the feed box, and all changes may be made by the operator without stopping the machine or changing his position. The changes are made by the simple movement of the levers bringing them into position indicated on the index plate which has each feed plainly marked on its surface, showing the exact position to which the levers must be brought to give a desired feed per revolution of the spindle. For example, suppose a feed at the rate of seventeen thousandths per revolution of the cutter is to be obtained, the lever B, as shown by the cut, is placed in the notch marked 3 on the lower quadrant C and then the lever A is brought to the line marked 3 opposite the space .017 on the index plate, the quick change lever D on the movement of the knee and cross movement of the carriage. When either the knee or carriage has been set to the required position, the clutch may be instantly disengaged by pressing in the knob on the front of the hand wheel thereby preventing any accidental change from their fixed position and also preventing the hand wheels from revolving when the automatic feeds are thrown in.

The knee, which is of the box type, is provided with a telescopic elevating screw which makes holes in the floor unnecessary and allows the machine to be placed regardless of beams or foundations. The thrust of the screw is taken by ball bearings.

In designing these machines the greatest care has been taken to secure the highest efficiency, together with accuracy and simplicity. Nevertheless, the parts are so arranged that they are within easy reach of the operator and of sufficient strength to prevent breakage from undue strain. Metal distribution has been properly proportioned, the base being very solid, thereby absorbing vibration. The arm is a straight steel bar, so that any of the regular attachments can be placed in position without the necessity of removing the arm.

AN AUTOMATIC NUT-MAKING MACHINE.

An unusually complete nutmaking machine has been built by the Ray Automatic Machine Co., of Cleveland, from the patented designs of A. D. Ray, a well known inventor now connected with the Eastman Metallic Body Co., of Cleveland, and formerly with the Fox Typewriter Co., of Grand Rapids, Mich. The machine is shown in Figs. 1 and 2, the former illustrating the general construction of the machine while the latter is restricted to the details of the punching, feeding and tapping mechanism which can therefore be shown on a larger scale.

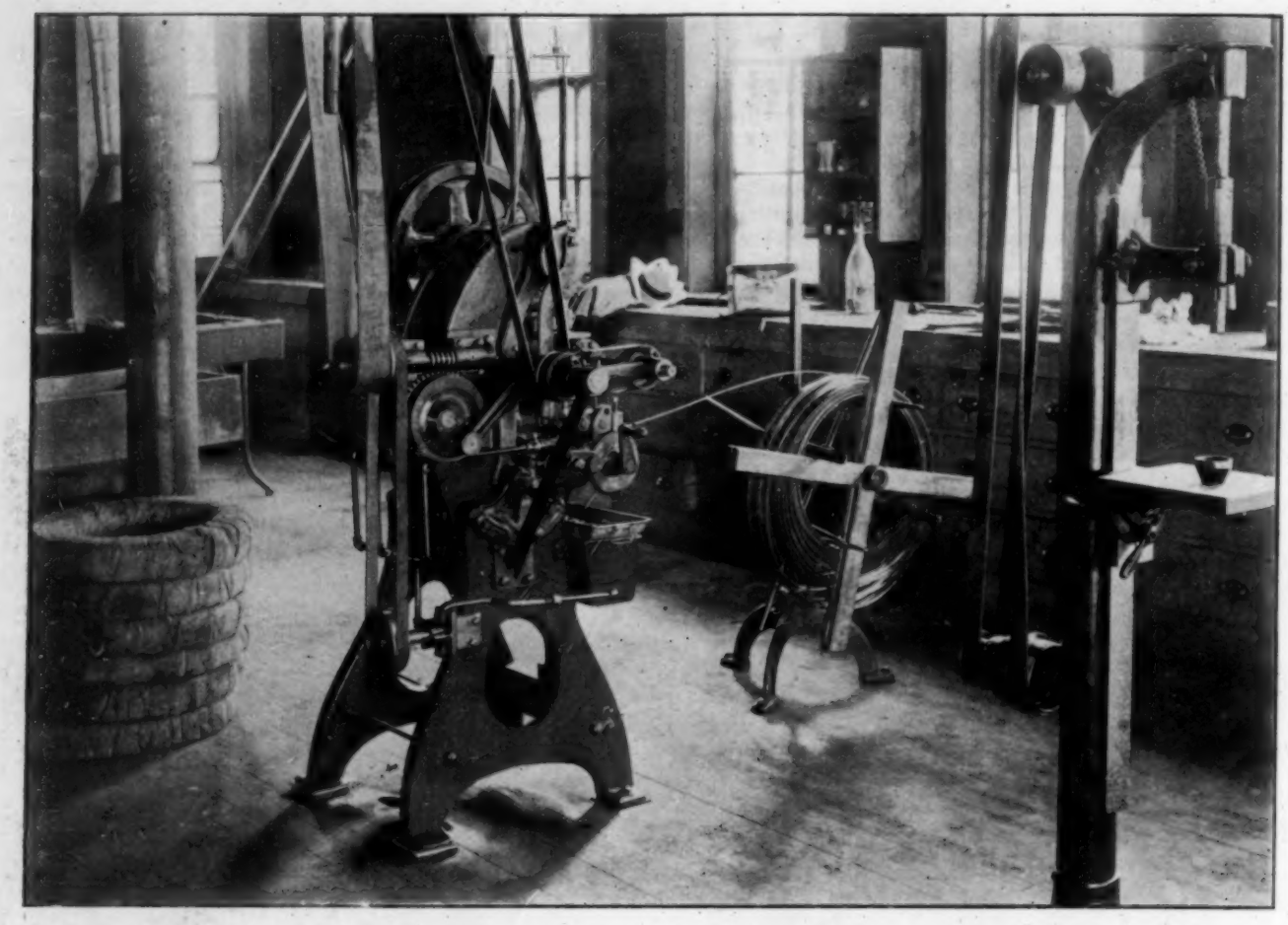


FIG. 1.—THE RAY AUTOMATIC NUT-MAKING MACHINE.

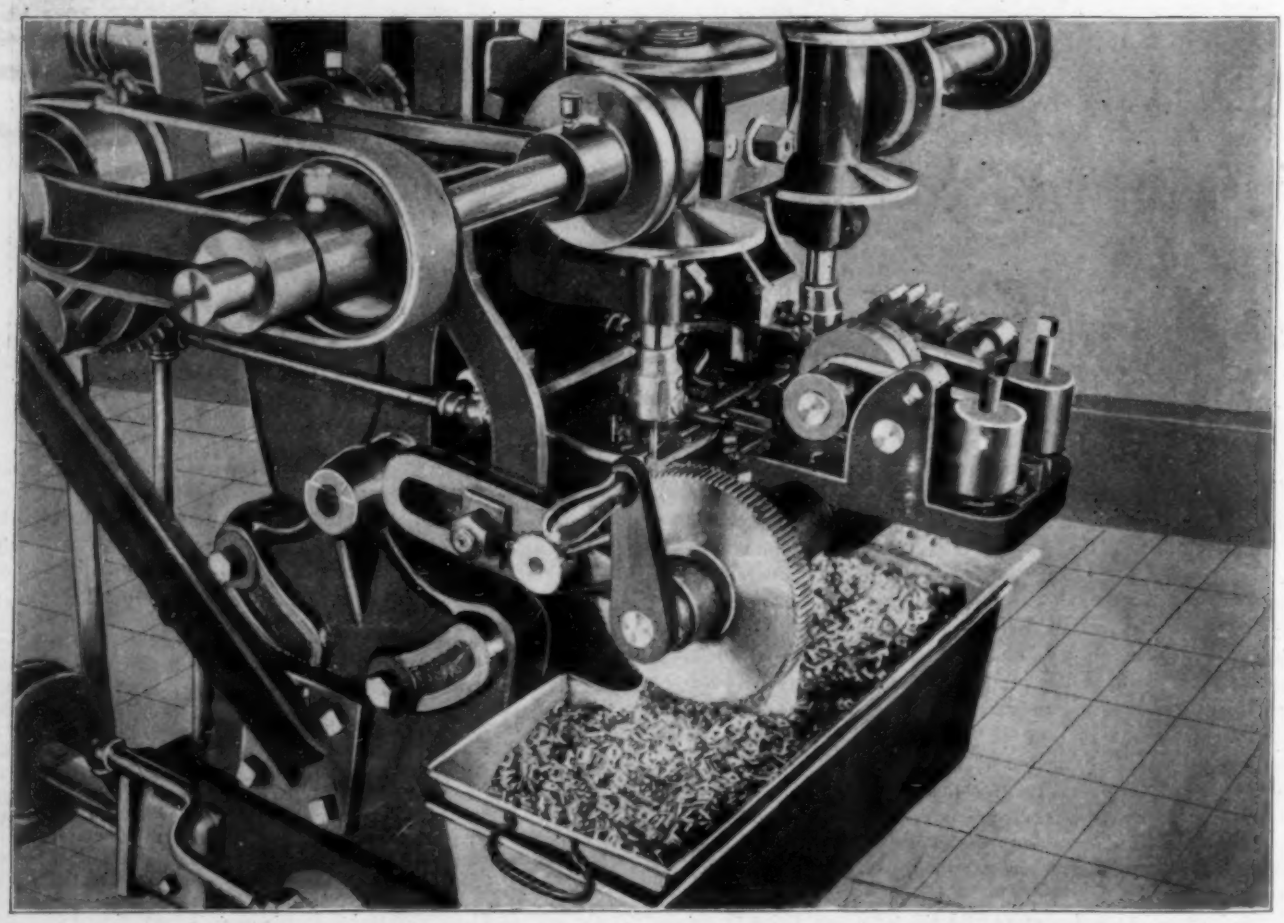


FIG. 2.—THE FEEDING, PUNCHING AND TAPPING MECHANISM OF THE RAY NUT-MAKING MACHINE

The machine provides for the punching of the nut from a flat strip, pierces the blank, taps out the hole and then ejects the finished nuts alternately from each side of the press at the rate of some 50,000 daily. The stock is fed into the machine from a coil mounted on a reel seen in front of the press, enters through a set of feed rolls and passes under a punch which cuts off the one blank simultaneously with the act of piercing the hole for the next in order. A runway leads to right and left of the die to the taps; this guide and tapping device being easily followed from the illustration seen in Fig. 2. A reciprocating finger feeds the nuts alternately from the die as they are cut off to the taps where they are threaded and then dropped into the tray underneath where the oil drains from them. All the operations of the machine are controlled by a cam shaft at the rear so that every working part may be accurately timed for the work it is to perform. Arrangements are made for the profuse lubrication of the taps, etc., the oil being taken from the drainage reservoir in front.

It will be understood that while a nut is being tapped under one spindle another pierced blank is being punched from the strip and carried in the direction of the other tapping spindle, thus avoiding any lost time between the different operations.

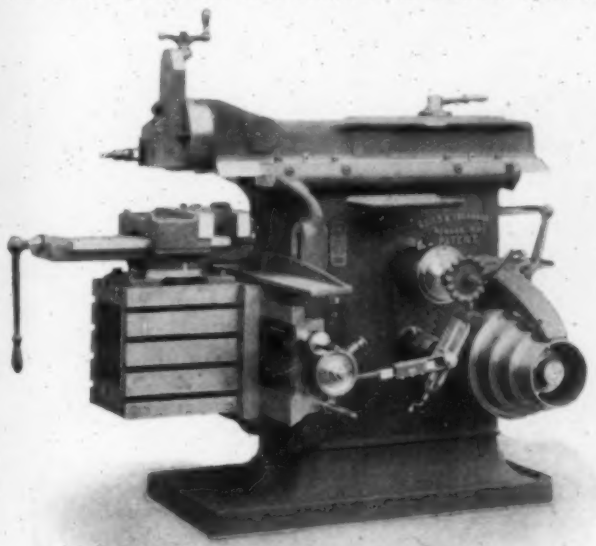


FIG. 1.—GOULD & EBERHARDT 24 INCH SHAPER, EQUIPPED WITH PATENTED OIL HOLE PROTECTOR, PATENTED SLEEVE CONE SUPPORT AND SELF-ADJUSTING CONNECTING ROD.

The division of labor between the two taps enables the machine to be run faster as the taps are of course the more easily injured elements and in this connection it will be seen that there is no turning of the blank after it is pierced and punched; the runway acting as a jig to bring the hole in each nut directly in line with the axis of the tap after the parts are once accurately set in position.

The machine is not limited to any style of product and will produce either square, hexagon or chamfered nuts. It is also practicable to punch, tap, counterbore, countersink and chamfer irregularly shaped flat steel and brass pieces of the type used in electrical, typewriter and cash register work. This is accomplished by the addition of an extra spindle at each side of the machine. These are not shown in the halftones as they are not required on the kind of work there in progress. On regular work it is intended that one operator shall attend to twenty machines, seeing that they are well supplied with stock and that the taps are renewed.

FIG. 2.—GOULD & EBERHARDT OIL HOLE PROTECTOR.

These machines have been in practical use for a year past, and it is the purpose of the company to extend the line considerably and to manufacture machines capable of producing large nuts as well as other automatic machinery products.

Work on the erection of the foundations for the open-hearth plant of the Youngstown Iron Sheet & Tube Co., Youngstown, O., has been commenced.

RECENT GOULD & EBERHARDT IMPROVEMENTS.

Gould & Eberhardt, of Newark, N. J., have recently brought out some patented improvements in their line of machine tools which are illustrated in the accompanying engravings. The shaper shown in Fig. 1 is the regular 24-inch machine and has been selected for presentation with the description of the new improvements because it embodies all of them in a single view, but, as will be seen, the different devices are applicable to other machines and the new bearing, for example, is being applied to all gear cutting machinery of this make.

The shaper is fitted with an automatic cross feed connecting rod which is self-adjusting for any position of the shaper table and does not require the loosening or tightening up of a set-screw. The connecting rod also has a friction slip which prevents breaking of the feed gears through accident or carelessness. In addition to this improvement the shaper has the patented oil hole protectors, a feature which has been applied to the entire line of machines. These oil hole protectors are made of brass in the shape shown in Fig. 2, nicely nickel plated and drawn with a solid conical top which sheds the dirt, chips, etc. The oil hole being on the side of the protector also

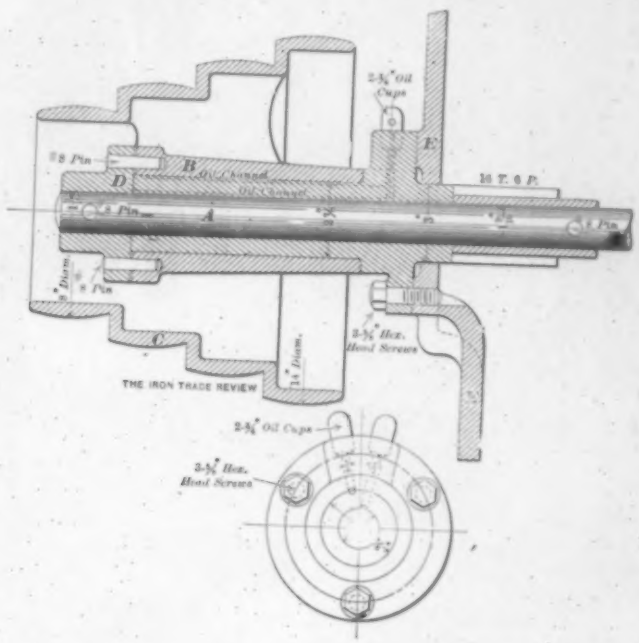


FIG. 3.—THE GOULD & EBERHARDT SLEEVE CONE SUPPORT.

tends to prevent the chips from entering; and the covers are provided with a felt pad through which the oil is filtered before reaching the bearings. This insures a perfectly clean lubricant and prevents grit getting an entrance and cutting the bearings. The protectors are made with a taper end so that they can easily be fitted into the oil holes and do not require any threading. They have an additional advantage in the single handed method of operation while the ordinary type necessitates one hand to hold the spring top back and the other to use the oil can. The felt pad used for filtering the oil can be easily renewed whenever it should be necessary, though this will evidently not occur except at long intervals.

A sectional view of a patented rigid sleeve bearing which Messrs. Gould & Eberhardt use on the cone shafts of all their shapers, gear cutters and other machines, is illustrated in Fig. 3. The cone C rotating on the sleeve bearing B drives the shaft A by means of the clutch D. The connection being made between the cone C and the clutch flange D by pins, the pins being a tight fit in the flange D and an easy fit in the cone C.

By the employment of this mode of construction the entire strain of the driving belt on the cone is carried by the rigid sleeve journal bolted by means of the flange to the side wall of the shaper as shown at E, the driving shaft being compelled to carry only the torsional strain incidental to the power requirements of the machine. This construction also reduces to a minimum the wear of the cone shaft bearing and furthermore insures the proper meshing of the driving gears. The parts of the bearing are all of cast iron. The builders claim

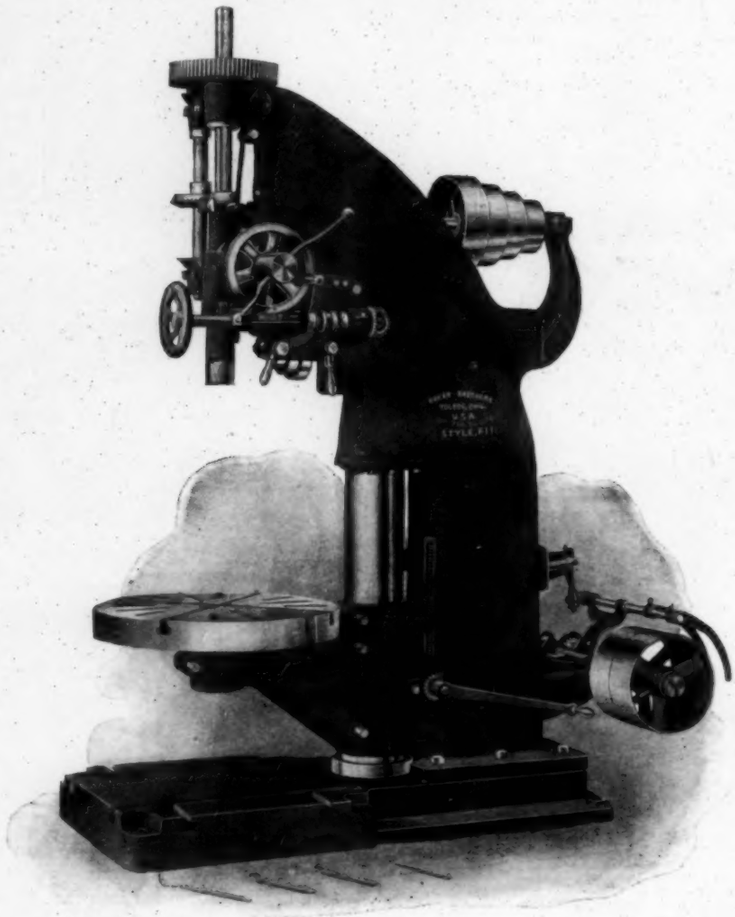
that with proper attention to lubrication this bearing should outlast the rest of the machine.

The extension base machine is also equipped with a casting over the cone which bears a series of figures indicating the appropriate speed for different strokes, a ribbed ram, an improvement which stiffens the ram and renders the cutting stroke truer; a vise with a special place to strike when lining up the work, avoiding one source of injury to the finished ways, and so constructed that there is a pulling instead of a pushing strain when tightening up the jaws, thus preventing any chance of buckling the vise screws; vertical graduations on the bottom of the vise which cannot be obliterated by ordinary wear. Provision is made for holding the crosshead rigidly direct to the frame, a close contact being maintained even when the back bolts are loosened for adjustment and thus chips and dirt are prevented from entrance between the crosshead and the slide. All bearings where there is an appreciable amount of wear are bushed so that the original centers can be easily and accurately preserved.

A NEW DRILLING, BORING AND TAPPING MACHINE.

Baker Brothers, Toledo, O., have brought out an addition to their line of drilling, boring and tapping machinery which will be known as the style F-11 drill press. The new tool is shown in the illustration and is a very solid machine. The main frames are all made in one piece and cored out. The general design and construction is of rigid type to withstand torsional strains and thereby reduce to a minimum the danger of breaking drills and on the other hand this stiffness ensures greater attainable accuracy in drilling operations.

The following special features are combined: power self feed, lever feed, hand worm feed, automatic stop and quick return for spindle. The combination of parts is so arranged that any of these feeds can be used independently of the others and with the greatest ease on the part of the operator. The feeding mechanism is very heavy, the worm gear being of steel and driven by a hardened steel worm running in a bath of oil. The spindle is powerfully back geared, having a gearing ratio of 1 to 7; being fully capable of drilling a hole through steel, 1½ inches in diameter with a feed of 1 inch per minute. The drill spindle has four changes of speed and three changes of feed, is fitted with hardened tool steel roller thrust bearings and is counter-balanced.



A NEW DRILLING, BORING AND TAPPING MACHINE.

The principal dimensions of the machine are as follows: Vertical traverse of table, 15 inches; maximum distance from spindle to table, 31½ inches; diameter of table, 28 inches; distance of post to center of table, 16¼ inches; vertical traverse of spindle, 12 or 16 inches; Morse taper No. 4 in spindle; diameter of spindle, 2⅛ inches; distance spindles are apart when in gangs, 5 feet; width of belt on cone pulley, 3 inches; weight when crated, 3,000 pounds.

The Chateaugay Ore & Iron Co., Plattsburg, N. Y., will rebuild its Standish Furnace, F. C. Roberts, of Philadelphia, Pa., having been engaged to do the work. The furnace will be 60x12 feet and will have three stoves. It will have a daily capacity of 100 tons of charcoal iron. The equipment will be furnished by the following concerns: Southwark Foundry & Machine Co., Philadelphia, blowing engines; Stirling Co., Chicago, boilers; Rarig Engineering Co., Columbus, O., furnace and stove shells and iron work; the Portsmouth & Kentucky Fire Brick Co., Portsmouth, O., linings.

The third stack of the Isabella Furnace plant, operated by the American Steel Hoop Co., at Etna, Pittsburg, which has been rebuilt and is now 20x90, was blown in this week. The three stacks are now in blast, two having been rebuilt during the past year and the remaining stack was rebuilt two years ago. The furnaces have an annual capacity of 500,000 tons.

The bi-monthly meeting of the Chain Makers' Association of the United States was held at Pittsburg, Pa., on Wednesday, Sept. 3. Trade conditions were considered but no changes were made in prices.

Shop Drawings at David Rowen & Co.'s Works, Glasgow.

The Production of the Drawing.

In the drawing office all drawings in connection with any contract or engine number are either "Standard" or "Contract," and, with the exceptions of general and pipe arrangements, are made on sheets 40 inches by 27 inches "Double Elephant," with the exceptions referred to later on.

Standard drawings, or "S. D.," are drawings of such arrangements and their details or pieces as have been adopted as standard articles and which never vary, and may be used for any job without alteration.

Contract drawings, or "C. D.," are drawings which have to be made specially for any particular job or contract, and which are peculiar to that job. Alterations or deviations from standard drawings fall under this heading.

Numeration.—In each series of standard and contract drawings, as the cuts indicate, a special method of numbering is followed. The standard drawings begin at 1 and run up to 1,999, then begin again at 3,000 and run up to 3,999, and then from 5,000 to 5,999, and in like manner for higher numbers.

The contract drawings begin at 2,000 and run up to 2,999, then from 4,000 to 4,999, then from 6,000 to 6,999, and also in like manner for higher numbers.

The drawings are known as "S. D. No. 1890," "C. D. No. 2,890," etc., according as they are standard or contract. It will be observed that above and including 1,000 all the standard drawing numbers begin with an odd figure, while all the contract drawing numbers begin with the even figure. The drawing numbers below 1,000 are standard. Thus it is possible to tell whether any drawing is a standard or a contract one by an inspection of the number alone.

The objects of the arrangements are (1) to allow the standard and contract drawings to be kept separately, and (2) yet allow each class to have a continuous series of running numbers, thus avoiding blanks, and showing when a drawing is not in its place in the drawer, and (3) to avoid having two simultaneous series of running numbers.

All contract and standard drawings, with exception of general and pipe arrangements, boilers, smoke-boxes, funnel, grating, and ladder arrangements, bilge and ballast arrangements, main boiler mountings arrangements, are made on sheets 40 inches by 27 inches. Each sheet is divided into ten equal rectangles or blocks, measuring 13½ inches by 8 inches, by dividing its breadth, horizontally, in halves, and its length, vertically, into five (see Figs. 1 and 2). Each block or section has a border line drawn ¼ inch from each side, making the space in which the drawing must be contained 13 inches by 7½ inches. Each block is numbered A, B, C, D, E, F, G, H, and I, as in Figs. 1 and 2, and the lower right-hand block is reserved for the drawing number and title.

Each block is known by its symbol, which consists of two letters and a fraction, thus—S. D. $\frac{290}{B}$ C. D. $\frac{2040}{C}$ etc. S. D. and C. D. indicate whether standard drawing or contract drawing, the numbers indicating the numbers in the class, and the numbers below the particular blocks or sections of the drawings themselves.

The title and lettering of each block is done, as in the examples illustrated by Figs. 1 and 2, for contract and standard drawing sheets. The lower right hand corner indicates against what cost section of the contract number the time and material have to be charged.

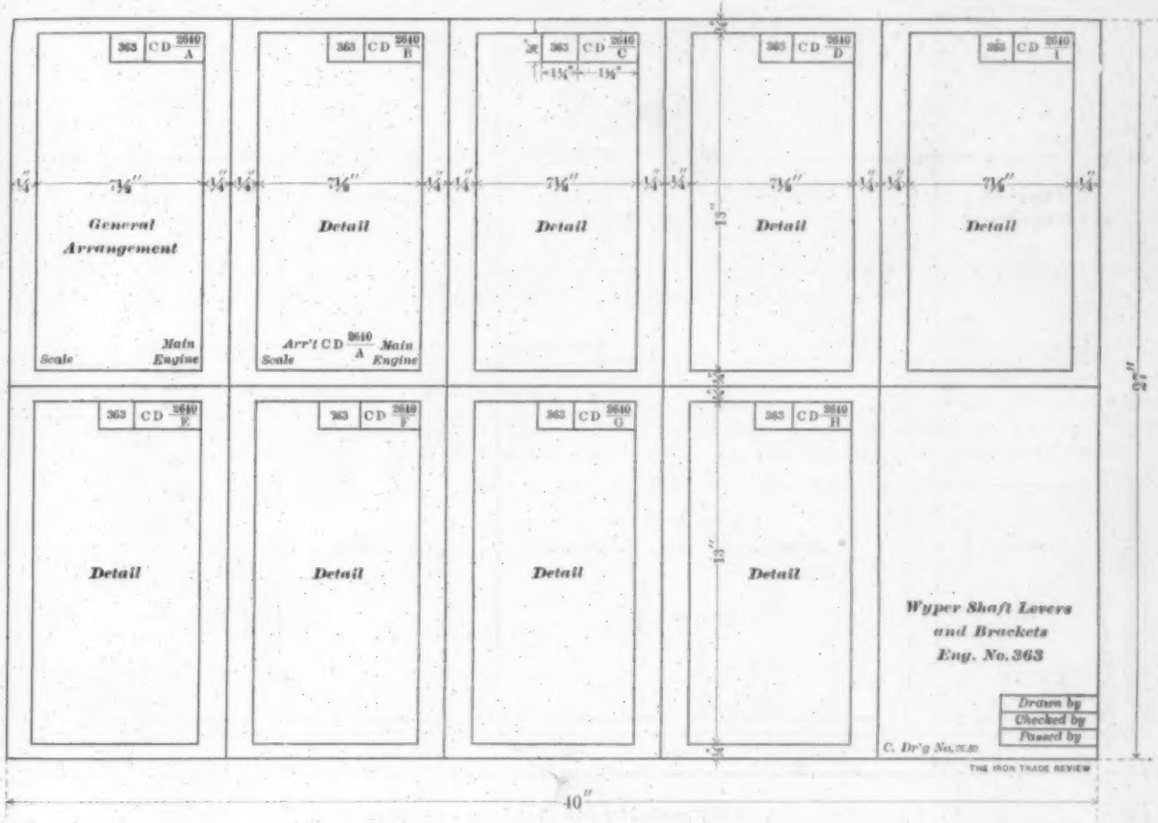


FIG. 1.—SYSTEM FOR CONTRACT DRAWINGS.

In the C. D. series the block devoted to the arrangement occupies section A at the top of the left hand corner of the sheet, and the details fill the following blocks, each block having one piece, and one only, drawn on it. Examples showing what appears on an arrangement block are given in Figs. 3 and 4. Should the necessary views of the arrangement or any of its details require more than one block for its proper representation, two adjacent blocks may be taken; but, except on the arrangement blocks, not more than one piece is shown.

Should the drawing require to show the method or attachment of the piece or its relation to another piece, this other piece is to be shown in dotted lines, and will, of course, be drawn in full on another block.

In the S. D. series the same principle is followed; there being but one piece to each block, with the arrangement on block A, and the details following in succeeding blocks.

Immediately a standard or contract drawing is started, the draughtsman goes to the drawing records and books the num-

ber, and at the same time he enters the proposed title and his name. On the completion of the drawing he enters particulars of the date finished and full title. A specimen page of the drawing record is given in Fig. 5. The draughtsman immediately fills up a C. D. or S. D. register card for the card cabinet. The standard drawing cards are white and the contract drawing cards are buff colored. These cards give the drawing numbers, general title, and the sub-title of each block. On the back appears the draughtman's name, and the date when finished. If the drawing is a contract drawing, the contract number first used is given.

The object of booking a number before the drawing is started is (1) to give the draughtsman a drawing number against which he may charge his time, and (2) to prevent half-finished or delayed drawings from going astray. The drawing after completion is examined by the chief draughtsman, who initials it, and it is passed into the tracing room for tracing, and the tracing is entered in the drawing record, Fig. 5, in the column headed "traced by." The tracing being made

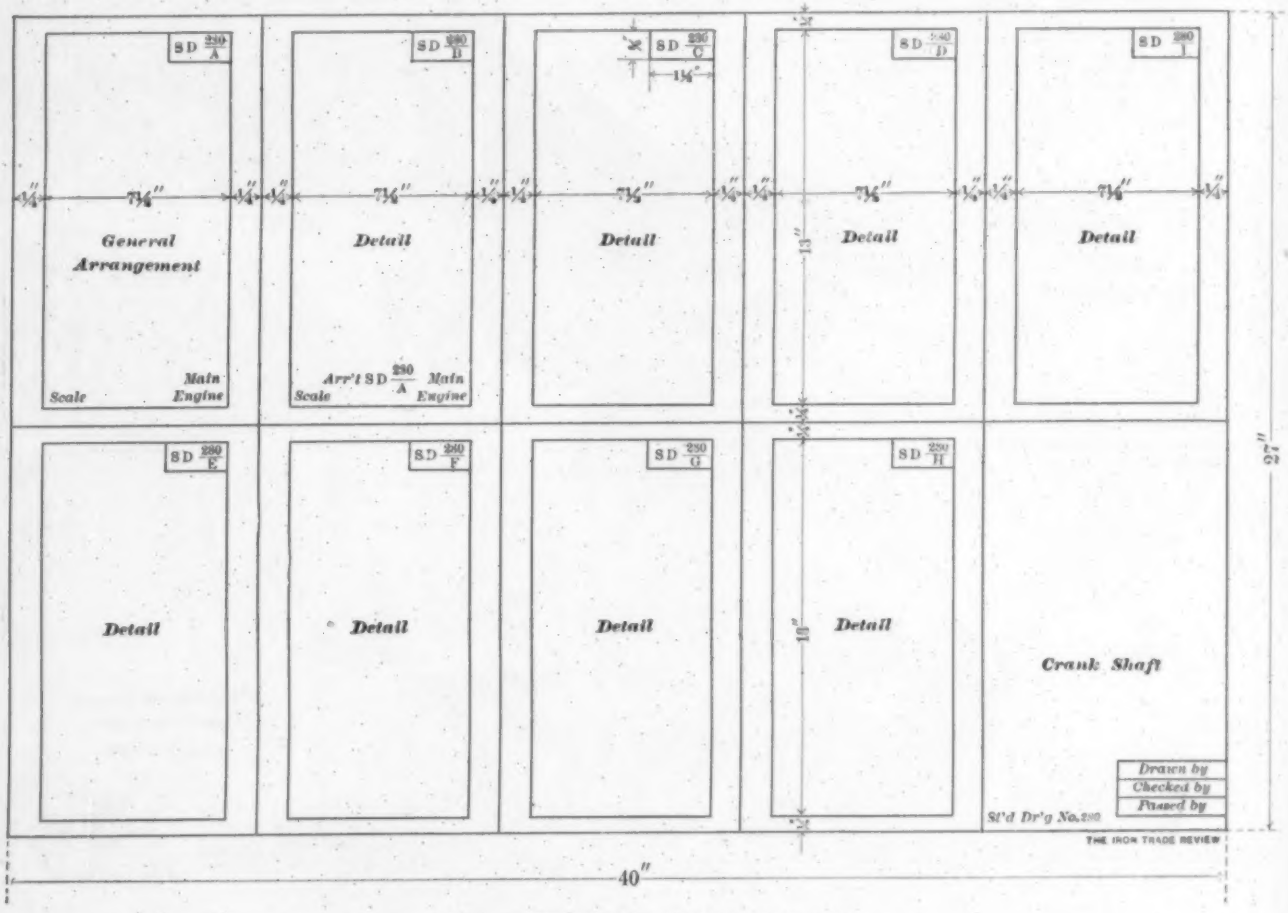


FIG. 2.—SYSTEM FOR STANDARD DRAWINGS.

and having been checked by the chief draughtsman, it is handed back to the draughtsman for him to make his drawing correspond with it. Both are stamped and initialled by the chief draughtsman. The tracing is then passed out for photographing, and the drawing filed away into its drawer in the drawing cabinet, while the register card is filed away in the card cabinet under its section or class of subject in the C. D. or S. D. drawing-register drawer.

This completes the production of the drawings in the drawing-office. We now pass to

The Issuing of Drawings to Works.

1. *Standard Drawings.*—Four blue-prints are taken of standard drawings, and are divided as follows:

(*a*) Two for works.

(*b*) One, of arrangement block only, for rate-fixing department.

(*c*) One, of arrangement block only, for drawing office.

The works prints are cut up into the blocks, and each block is pasted on a steel sheet, and is called a "shop card." On the back of each sheet is pasted a form, giving the contract numbers which use this particular standard drawing. The shop cards are then varnished over front and back, marked up with the first contract number they are to be used for, dated, and are ready for issuing to the shop. There are thus two sets of shop cards for shop use, and they are divided as follows:

One complete set, including the "arrangement," is sent to, and is for the exclusive use of, the machine and erecting shops, the machinemen and surface tablemen using the blocks of the details, and the erectors the arrangements. By thus having one piece on one card no two men can require the use of the same card at the same time.

The remaining set is divided between the patternshop and smithy, the sheets containing the cast iron, cast brass, or cast steel details going to the pattern shop, while those containing forge work go to the smithy, and are for the sole use of these departments. The "arrangements" are sent to either the pattern shop or smithy as circumstances warrant. To insure this each card has either "Machine Shop," "Pattern Shop," or "Smithy" stamped on it, so that there can be no doubt subsequently as to the ownership of any shop card which goes astray. Once these standard shop cards are issued, they are never returned to the drawing office unless for alteration or to there in a manner described later on.

The rate fixing and drawing office (blue prints *b* and *c*) are next pasted on cardboard sheets. The cards of one set are sent down to the rate fixing department, and are called "time office cards." The cards of the other set are filed away in the drawing office for use there. These are called "drawing office cards." The back of both of these sets of cards is printed as shown in Fig. 9. The drawing office set of cards is used for registering (on their backs) the contract or engine numbers which have used these particular blocks in their construction, be cancelled; but always remain in the works, and are stored and thus avoid stamping the drawings themselves. The time office cards also have on their backs the contract numbers, although this is not essential. They were principally used as a guide for determining the time allowances for each operation under the premium system of payment followed at these works, when this system was started and before sufficient data had been accumulated. The cards are now only used for reference. The premium system of payment followed at these works was

described in the paper read by Mr. James Rowan in the Mechanical Section of the Glasgow Engineering Conference of last year.

2. *Contract Drawings.*—When contract drawings have to be issued, only three blue prints are taken—one on cloth and two on paper—and are distributed as follows:

(*a*) One, cloth, for machine shop.

pletion of the job, and are either destroyed or kept for the reissue of a duplicate job.

Storage of Drawings in Works.—The machine shop set of standard drawings is stored and kept in the machine shop tool room in trays, the drawings being in their proper numerical order. The storeman, who has charge of them, hands them out to whoever requires them, at the same time marking on the

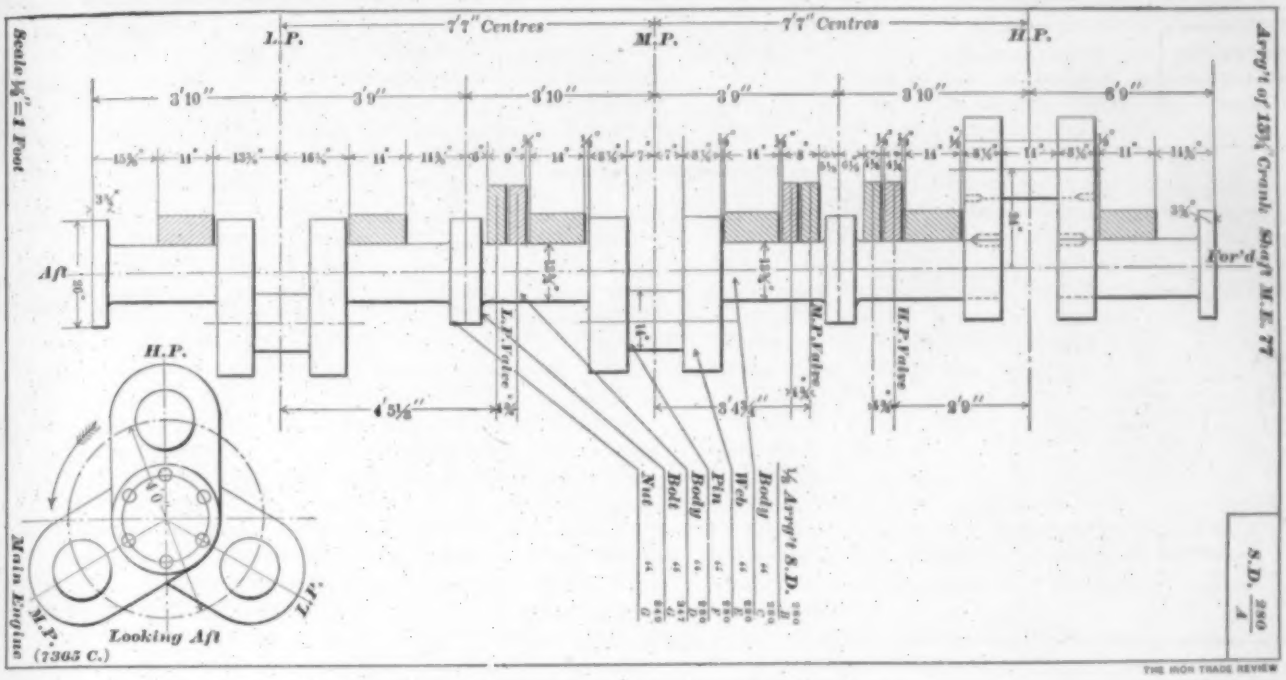


FIG. 3.—REPRODUCTION OF "ARRANGEMENT" BLOCKS.

(*b*) One, paper, for pattern shop and smithy.

(*c*) One, paper, of arrangement only, for rate fixing department.

These are cut up, and each set for each department is clipped together with a title-page on the outside. The machine shop

slip provided for the purpose the man's number and date. As they are returned this entry is scored off. The contract drawings are treated in the same manner. The pattern shop and smithy sets of drawings are kept in their respective department in trays, as in the machine shop. Each department has thus a

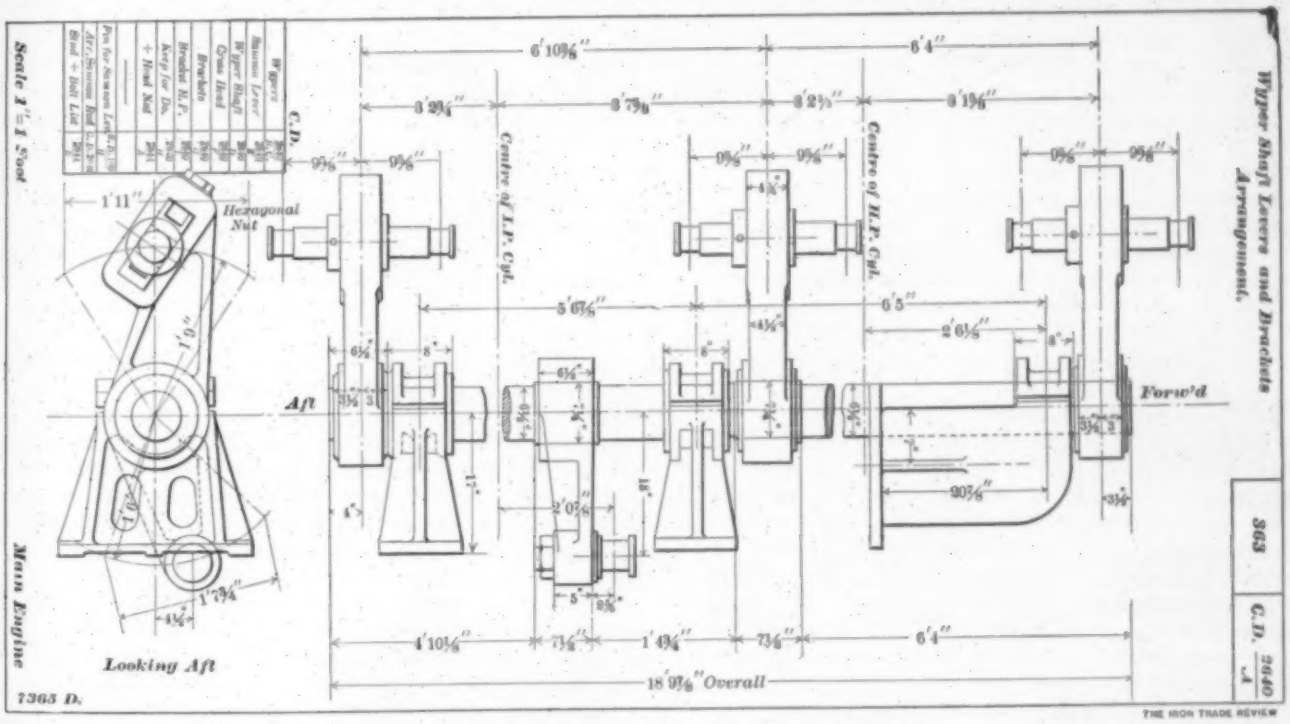


FIG. 4.—ANOTHER EXAMPLE OF "ARRANGEMENT" BLOCKS

gets a complete cloth set. The second set is divided between the smithy and pattern shop. The photo print of the arrangement is sent to the rate fixing department. As each of these contract drawing blocks has the contract or engine number stamped on its face, as well as its own C. D. number, it may become detached from the rest, and yet not be lost or separated from its contract number. Unlike the standard drawings, these contract drawings are returned to the drawing office on completion of the job, and are either destroyed or kept for the reissue of a duplicate job.

complete set of drawings for its own exclusive use, and does not require to borrow.

Factory Orders.

As the drawings themselves are not regarded as shop orders to proceed with the work, but merely as guides to show how the work is to be done; and especially as the standard shop cards always remain in the works, never returning to the drawing office, some sort of order to the shops is required to in-

dicate which shop cards are to be used for a particular contract. Cards, 6 inches by 4 inches called "factory orders," are therefore issued, and for uniformity as well as for indexing purposes, to be described later, these are issued with the contract drawings. One card is issued for each block or section to be used; in other words, there is one card for each piece and arrangement of pieces. One set of these factory orders is written out, and after being entered in the drawing register,

(*a*) Those referring to general arrangements which are sent down to the works manager's office direct.

(*b*) Those referring to cast details are sent direct into the pattern shop.

(*c*) Those referring to malleable iron details, which are sent direct into the smithy.

Those factory orders (*a*) dealing with arrangements of details are sent down to the engine works manager's office in or-

Drawing No.	Description.	Contract No.	Drawn by	Date.	Traced by	Date.

FIG. 5—DRAWING RECORDS.

——	Hours Allowed.	RECORDS. Hours Taken.	Date.	Hours Taken	Date.	Hours Taken.	Date.	Hours Taken.	Date	Hours Taken.	Date.
Turning											
Boring											
Planing											
Slotting											
Milling											
Hole-boring											
Screwing											
Fitting											
Total											

Contract No.	No. Off.	Remarks.		Cont. No.	No. Off	Remarks.		Cont. No.	No. Off.	Remarks	
Rough weight											
Finished weight											

FIG. 6—TIME-OFFICE CARD.

S.S. No. 239. Contract No 364.

Date, 1902.	C. D. No.	S. D. No.	——	A	B	C	D	E	F	G	H	I
22/3	2375		Bedplate	x	x	x	x	x	x	x	x	x
24/3	—	336	Connecting-rods	x	o	x	o	x	x	x	o	o
24/3	—	340	Bottom end bushes	o	o	o	x	x	x	o	o	o
24/3	—	304	Piston-rods	x	x	x	x	x	x	x	x	o
25/3	—	501	Pump and head and rods; two feed, two bilge (A and C pumps, M M rods)	x	x	o	o	C B 14/360	o	C B 14/361	x	x

FIG. 7.—DRAWING REGISTER.

MACHINE SHOP.

FOUNDRY.				Operation.	Shop.	Date Finished.	Foreman.
PATTERN SENT.		CASTING DELIVERED.					
Date.	Foreman.	Date.	Foreman.				
				1			
				2			
SMITHY.		Date.	Foreman.	3			
FORGINGS MADE.				4			
				5			
OFFICE.				6			
ORDER SENT.		DELIVERED.		7			
Date.	Order Clerk.	Date.	Foreman.	8			
				9			
				10			

FIG. 8—FACTORY ORDER.

Fig. 7, is issued to the works. These factory orders are subdivided into two classes as under:

1. Factory orders for material ordered from inside.
2. Factory order for material ordered from outside.

1. *Factory Orders for Material Ordered from Inside.*—These factory orders are still further subdivided in the drawing office into:

der to keep him advised that the material called for on the arrangement factory order has been ordered from the various departments. These factory orders remain in this office until the termination of the contract.

Factory orders (*b*) and (*c*) are sent to the pattern shop or the smithy; the foreman, or his clerk, of each department files these orders in the special drawer in the compartment, or

division, set apart for the contract number. After the foreman of each department has executed the work called for on the factory order, he takes the order from its place, and, having initialled and dated it on the back, in a space set apart for the purpose, as shown in Fig. 8, he sends it into the machine shop, where it is placed in a cabinet, which has drawers divided into compartments set apart for particular contract numbers. Thus the foreman pattern maker and foreman smith, by looking over the factory orders, see only the work which is ahead of them, and which has yet to be done for each particular contract number. As each factory order represents only one kind of article, it follows that so long as there are any lying in the compartment for any particular contract number, the pieces called for on these factory orders have yet to be made. Thus the risk of forgetting small details is avoided, or, at least; very much minimised.

2. *Factory Orders for Material Ordered from Outside.*—The factory orders for the material which is not made in the works, but is to be ordered from outside contractors, are sent direct from the drawing office to the counting house with photo prints, or sketches, of the material which they represent. If only a sketch is supplied, this is made on the ordinary foolscap sheet, and sent with the factory order. This sketch is copied into the drawing office copy book, set apart for this purpose, and, it, as well as the factory order card, has the copy book number and page marked on its top right hand corner. These factory orders for outside material are placed by themselves in the counting house in a receptacle under the charge of the order clerk, who initials and dates them as each order is sent to the outside contractors. He will send them down to the works, distributing them as follows: Those factory orders calling for material or goods of the nature of finished material (such as asbestos, cocks, rubber valves and safety valves), which should be delivered into store, are sent down to the storemen, and are filed by them in a suitable cabinet drawer under their contract numbers. The storemen will thus be kept advised of the ordering of this material, and by referring to the factory orders in the store the manager and foremen know what has been ordered, and when it was ordered. By suitable filing they are able to say what is delivered and what has still to be delivered.

Those factory orders dealing with raw material ordered direct from outside people, and upon which machine work has to be done (such as forgings of shaftings, connecting rods, etc.) are sent down to the machine shop, and there filed in the cabinet drawer amongst the other factory orders from the smithy and pattern shop.

Factory Orders in the Machine Shop.—As the factory orders from the pattern shop, smithy, and some from the counting house all converge in the machine shop, they have to be available for the inspection of the various foremen who have to deal with them. It is obvious from the foregoing arrangement that only the smithy factory orders represent pieces actually made and delivered to the machine shop, and that when these factory orders reach the machine shop the pieces called for are actually in existence and awaiting the machine work. This, however, is not the case with the factory orders which are sent in from the pattern shop and counting house. When these cards reach the machine shop they only inform that department that these pieces have been ordered and when they have been ordered; but as to whether the pieces are delivered, or are to be delivered, no definite information is given. This want has to be submitted to for the present, although it mght be remedied in one or other of the following methods:

1. By making the man who receives the castings and heavy forgings retain possession of the factory orders until the actual pieces are delivered, when he could then place them in the machine shop cabinet; or

2. By retaining the factory orders in the pattern shop and counting house until the pieces were delivered, and then sending them down to the machine shop.

Factory Orders for Valve Chests and Cocks Made in Works.—These factory order cards are white. They are used for ordering out all valves, chests, and cocks, etc., and other material in connection with the pipe arrangements. One valve or article only is sketched on each card, with all other necessary information in copying ink. These factory orders are reproduced in the mimeograph machine, and the copy is sent to the pattern shop and smithy as required, and filed under the proper contract number until the valve or piece has been ordered. The foreman then initials and dates the card, and sends it down to the machine shop, where it is filed until that department's machine work has been done on it. It is then initialled and dated by the foreman, sent up to the erecting shop foreman, and filed by him in such a manner as to show what has been finished and is ready, and what yet remains to be done. The original set is retained in the drawing office.

In addition to the above mimeograph copy, and at the same time as it is being taken, four copies on a foolscap sheet are taken for the use of the outside foreman and erecting shop foreman. There is also one spare and one for the engine works manager.

The factory orders from smithy, pattern-shop, and counting house, duly initialled and dated, showing that they have had the attention of these departments, are then sent down to the machine shop, to be placed in the cabinet which is in the tool room, being deposited in the drawer for factory orders and in the compartment for the contract number.

Each of the compartments is still further subdivided by means of guide cards into sections for:

A. Shop.
B. Shop.
D. and E. Shop.
Finishing Shop.

It is the duty of the engine works manager to allocate these factory cards to the proper sections by placing them in each of their compartments. Thus by inspection of the cabinet at any time will be seen how much work for each department is waiting to be done.

Those factory orders remain in the cabinet drawer until all machine work is completed, when they will be removed and placed in the compartment for finished work.—*London Engineering.*

The Census Bureau has issued a bulletin on the manufacture of electrical apparatus and supplies. In 1900 there were 580 establishments with a capital of $83,130,943. The value of the products is returned at $91,348,889. The report enumerates 19 States where this industry is located, New York leading with 134 establishments and Illinois coming next with 82 and Ohio and Pennsylvania closely contesting third place with 64 and 63. On the other hand, in gross value of output, Pennsylvania heads the list with $20,967,587, as compared with $17,697,352 for New York, $11,641,177 for Illinois and $8,259,612 for Massachusetts.

The Byers Green Colliery, of Auckland, north of England, owned by the British iron and steel firm of Bolckow, Vaughan & Co., whose blast furnace plants are now being reconstructed on American lines by Frank C. Roberts, of Philadelphia, and whose Cleveland (English Midlands) works are being electrically equipped by the Westinghouse interests, is to adopt American electric coal cutting machinery.

A report issued by the Census Bureau shows a capital of $40,813,793 invested in the manufacture of locomotives in the 28 locomotive works reporting for the United States in 1900. This sum represents the value of land, buildings, machinery, tools and implements, and the live capital utilized, but does not include the capital stock of any of the manufacturing corporations engaged. The value of the products is returned as $35,209,048, to produce which involved an outlay of $10,899,614 for wages, $1,369,341 for miscellaneous expenses and $20,174,395 for materials, mill supplies, freight and fuel.

Sir W. G. Armstrong, Whitworth & Co. are bringing out a cutting steel, which has been named the "A. W.," and they are also designing a special lathe for this quick-speed turning steel. As an illustration of what has already been done with special qualities of high-speed tool steel, it may be mentioned that a tool has been run for forty-five minutes at 150 feet per minute, with a 3-16-inch cut and in 1-16-inch traverse—a speed which exceeds that of the Taylor-White process at the Paris exhibition by 25 percent in cutting speed, whilst the cutting was continued for more than twice the length of time.—[Mechanical World.

TIME REQUIRED TO TURN A PIECE.

BY ROBERT GRIMSHAW.

In estimating the cost of a job it is necessary to know, among other things, the minimum time in which it can be turned or otherwise worked, and then to add something for contingencies, as well as for the time necessary to chuck the piece and to remove it from the lathe or other machine. It is a simple matter to make a table showing how many minutes or turns it will take to turn a piece an inch long, the cutting speed and the feed being given, on pieces of various diameters. The time needed for an inch in length has only to be multiplied by the length in inches, to give the desired information. The following table gives the circumferences of cylinders of various diameters in inches, and the figures are necessarily also the areas of the convex surfaces, an inch in length, of each cylinder:

Diameter.	Circ.*	Number of Inches of Cut, at the Feeds here given.							
		1/32"	1/16"	3/32"	1/8"	3/16"	1/4"	1/6"	1/4"
1"	3.14"	100.48	50.24	33.49	25.12	16.74	12.56	8.37	6.28
1 1/8	3.53	113.12	56.56	37.71	28.28	18.85	14.14	9.43	7.07
1 1/4	3.93	125.68	62.84	41.89	31.42	20.95	15.72	10.47	7.86
1 3/8	4.32	130.24	65.12	43.41	32.56	21.71	16.28	10.85	8.64
1 1/2	4.71	150.72	75.36	50.24	37.68	25.12	18.84	12.56	9.42
1 5/8	5.11	163.52	81.76	54.51	40.88	27.25	20.44	16.63	10.22
1 3/4	5.50	176.	88.	58.67	44.	29.67	22.	14.67	11.
1 7/8	5.89	180.48	90.24	60.16	45.12	30.08	22.56	15.04	11.78
2	6.48	200.96	100.48	66.99	50.24	33.49	25.12	16.75	12.56
2 1/4	7.07	226.24	113.12	75.41	56.56	37.71	28.28	18.85	14.14
2 1/2	7.85	251.20	125.60	83.73	62.80	41.87	31.40	20.93	15.70
2 3/4	8.64	276.48	138.24	92.16	69.12	46.08	34.56	23.04	17.28
3	9.47	301.44	150.72	100.48	75.36	50.24	37.68	25.12	19.84
3 1/4	10.21	326.72	163.36	108.91	81.68	54.45	40.84	27.23	20.42
3 1/2	11.	352.	176.	117.33	88.	58.67	44.	29.33	22.
3 3/4	11.78	376.96	188.48	125.65	94.24	62.83	47.12	31.41	23.56
4	12.57	402.24	201.12	134.08	100.56	67.04	50.28	33.52	25.14
4 1/4	13.35	427.20	213.60	142.40	106.80	71.20	53.40	35.60	26.70
4 1/2	14.14	448.48	224.24	149.49	112.12	74.41	56.56	37.37	28.28
4 3/4	14.92	467.14	238.72	155.81	119.36	77.91	59.68	38.95	29.84
5	15.71	502.72	251.36	167.57	125.68	83.79	62.84	41.89	31.42

*Also convex area of one inch in length (in *square inches*).

Having this table as a starter, the figures in the square corresponding to the given diameter of the work-piece and the given feed (both in inches) must be multiplied by the length of the piece and divided by the speed per second (both also in inches) to give the number of seconds it takes to turn the piece, once it is chucked.

Thus: Shaft 3 inches in diameter and 10 feet—120 inches long—will take, if the feed is 1/8 inch per rotation and the cutting speed 6 inches per second, 75.36 times 120 divided by 6 equals 1507.2 seconds equals 25.12 minutes.

If the speed is known in feet per minute, then this may be rapidly reduced to inches per minute; we will have in the above case, at 30 feet per minute, 75.36 times 10 divided by 30 equals 25.12 minutes, as before.

The article by Mr. Grimshaw given above is an interesting contribution to the scanty store of technical information bearing upon the calculation of the time required to perform machine tool operations. The constant efforts toward the improvement of tool steels and the greater efficiency of machine tools render it difficult to lay down a hard and fast line regarding the maximum cutting rate which can be profitably attained in ordinary work upon different materials and nothing is therefore attempted here in that direction. The plan suggested reminds one of the various rules arranged by different machine shops in order to arrive quickly at an average estimate in computing time limits from the drawing. For example, the Bullock Electric Mfg. Co., of Cincinnati, has adopted the following plan in its premium department for estimating the time to allow on any piece of work. The calculations are made by formula. These formulae being derived from the old time records by forming algebraic equations, taking each operation performed by the workman as a known constant and substituting variables from different records of the same kind of work, but of different sizes. Solving these equations, constants were derived which could be used in figuring the time on any piece of similar work. As an illustration, we will take the following data used in the Bullock plant in estimating time limits on small commutator sleeves: 30 minutes for chucking, 4 minutes per inch of section for boring, 5 minutes per inch of section for turning, 8 minutes per inch of diameter for chasing. Along this line of thought the following item which is taken from a paper read by L. R. Pomeroy, before the Master Mechanics' Association, will be of interest:

"One of the most valuable fields of investigation for a shop foreman is that of the cost of doing work on or by means of different machine tools, which are used in doing the work which he is required to supervise. One may say 'that goes without saying,' but in my experience, when you pin a foreman down as to the cost of different things you get very different replies. Some men, when you ask the cost of doing a certain piece of work—manufacturing, for instance, certain details of a locomotive—would give you the cost of the man's wages who runs the machine that manufactures this, taking the number of hours that he has to have the piece in the machine; another man will add to that the cost of the material that goes to make up the piece, but this is by no means the total cost of the manufactured part; in fact, it in general is rather a small percentage of the total cost. I recently had some investigations of this sort made in one of our shops, and I was rather surprised to find how much of the actual cost of manufacturing a certain article or doing a certain job of repair work was in the cost of moving the materials and appliances which are used to enable the man to do the job, and putting them away, in the grinding of tools, and of the indcidental time that is taken up in manufacture. I had and am having this looked up in different shops, and as an example of what is being done in this direction, I will cite a case of boring cylinders, which is familiar to all railroad men. I have in my hand the statement of cost of boring cylinders of certain engines. I will simply read the data of the cost of this, with a view of showing the method which should be employed in arriving at the cost of doing this kind of work and of analyzing it, so that the different items of expense which enter into the total cost may be known and intelligent action taken upon them:

Boring Cylinders, Engine 208.

Right cylinder, before boring, 16 1/8 ins.; after boring, 16 1/4 ins.
Left cylinder, before boring, 16 1/8 ins.; after boring, 16 9-32 ins.

	Hrs.	Mins.	Rate.	Amt.
Getting in boring bar	0	30	$1.90	$0.095
Putting bar in cylinder	0	45	1.90	.15
Putting up flex. shaft	1	0	1.90	.19
Rope broke and repaired	0	30	1.90	.095
Roughing in cut	0	35	1.90	.11
Finishing cut	0	30	1.90	.095
Counterboring back end	0	30	1.90	.095
Counterboring front end	0	15	1.90	.05
Repairing and grinding tools	0	30	1.90	.095
Changing bar	1	15	1.90	.24
Roughing cut	0	35	1.90	.11
Finishing cut	0	30	1.90	.095
Counterboring back	0	35	1.90	0.11
Counterboring front	0	15	1.90	.06
Taking down bar	0	20	1.90	.67
Helper on job	3	35	1.90	.67
	12	10		$2.31

"In order that ways and means for the reduction in cost of work may be intelligently effected, we must first determine what the work is actually costing under existing conditions; by being armed with this information we may argue from facts, and the force of our statements will be much greater.

"The storehouse, besides serving the useful function involved in its name, can be made still more valuable as the basis of an adequate and comprehensive cost-keeping plan, by using it as the "clearinghouse" of the system."

Rolling Rods Direct from Small Ingots.

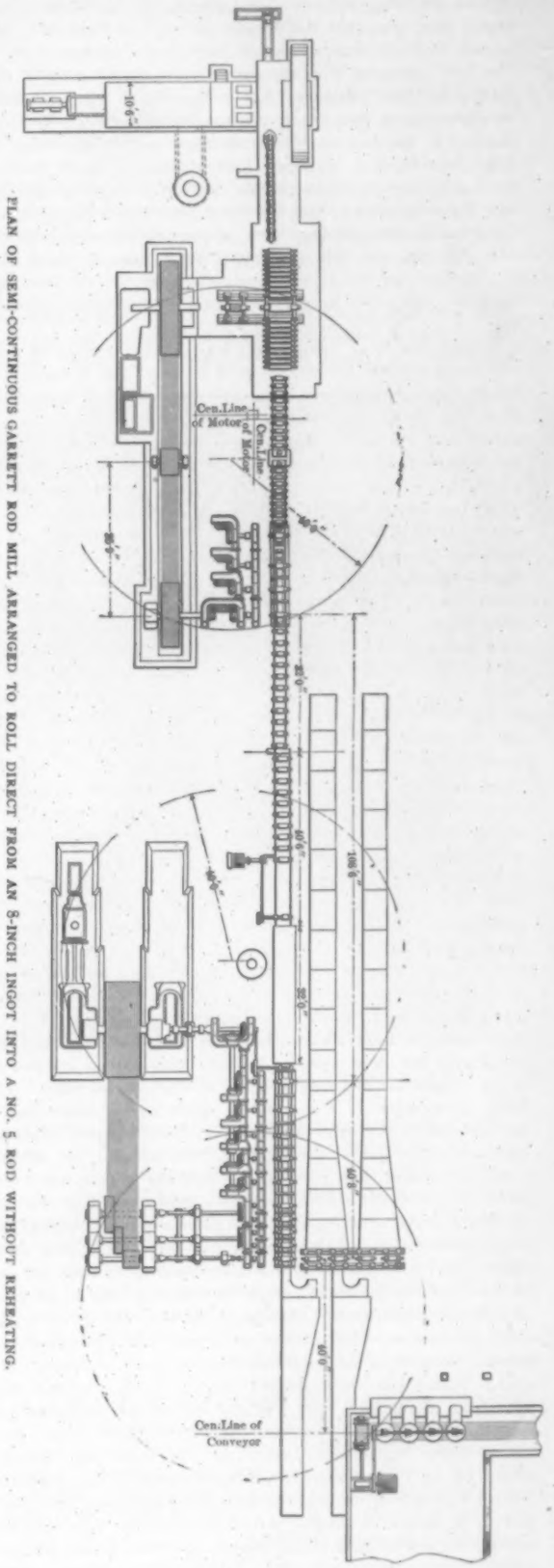
BY WM. GARRETT.

Among the various economies in the manufacture of rails, structural steel, plates, merchant steel bars and rods, great efforts have been made to roll the same at the lowest cost possible from the raw material. Today while the Illinois Steel Co., the Lackawanna Steel Co. and the Maryland Steel Co. make standard rails direct from the ingot, there are some, notably the Edgar Thomson steel plant of the Carnegie system, the Cambria Steel Co. and also the Pennsylvania Steel Co., who claim they will gain more economical results by giving the piece, after being bloomed down from the ingot, a slight reheating before being rolled into a finished rail.

When we find that these two systems are being and have been for a number of years operated by such successful concerns as mentioned above, we must come to the conclusion that if there is any difference at all in the cost of manufacturing the finished rail it cannot be anything like a large amount. At one time in making wire rods in this country it was customary, after heating the ingot, to roll it into blooms, heating the blooms and then rolling the same into a small billet from 1⅛ to 1½ inches and then heating the small billet again and rolling same into rods. The introduction of the "Garrett" rod mill, whereby it was made practicable to take a 4-inch billet and roll it directly into No. 5 rods, made a most complete revolution in the manufacture of wire rods not only in this country but throughout the entire civilized world.

It is a remarkable fact that this came about just at the time when the largest and most successful manufacturers of wire rods and wire in this country—the Washburn & Moen Mfg. Co.—after they had made the continuous mill for the purpose of making wire rods a success, when they had spent a large amount of money in perfecting and remodeling their rod mill plant so as to be able to heat and handle the small billet at the lowest cost, were in the position of the man of whom we have read, who said, "Now I will let my soul take ease." Apparently they had arrived at a point where in their judgment they were so far ahead in the race of making wire rods that they could, as it were, "take a breathing spell" and take it easy. Just at that time the "Garrett" rod mill came into use and the ability of the latter to make wire rods direct in one heat from the 4-inch billet caused them to remodel immediately almost their entire steel plant so that they might be able to use a 4-inch billet, and this at a great expense. It is unnecessary to point out how universal is the use of the 4-inch billet, because it is today the cheapest product we know of in the shape of steel. It is but fair to say that owing to catering to the ancient and we might say barbarous methods of other days, for the manufacture of finished material in the shape of steel abroad, the American steel manufacturers have perfected the process of making a small billet, say 1½ inch and above, direct from the ingot. Thus small billets can be sold in the open market for $1 a ton above the price of a 4-inch ingot; and there are thousands of tons of these small billets being used in this country today. Strange to say some of these small billets are being used for the purpose of making wire rods, when it is an absolute fact that the tonnage labor in taking the 4-inch billet in the yard and delivering it ready to be put on cars to reduce the 4-inch billet to wire rods on a modern "Garrett" mill is less than $1 per ton—the difference in cost in the open market between a small billet and a 4-inch billet.

While the British manufacturers and some of the Americans clung to the small billet we find that the German and Belgium manufacturer did not agree with them, but did all they could under the circumstances, even with the old fashioned rod mills, to use a billet not only 4 inches square, but it has become practical for them today to take a bloom 6 inches and 7 inches square, heat the same and roll it direct into No. 5 and No. 6 rods without reheating. In that practice they take this 6-inch or 7-inch square bloom and roll it down to 2 inches square, cut the first end of the billet at that stage, then cut this billet into two parts and roll them, one after the other,



PLAN OF SEMI-CONTINUOUS GARRETT ROD MILL ARRANGED TO ROLL DIRECT FROM AN 8-INCH INGOT INTO A NO. 5 ROD WITHOUT REHEATING.

without reheating, into finished material. This has been found so practical and profitable that a large number of the rod mills in Germany and Belgium are making wire rods by that method today. Since the formation of the United States Steel Corporation the cost of a 4-inch or small billet in the shape of steel

is but very little higher than the cost of finished bars or wire rods and all parties who own a rod or wire mill at the present time are at their wits' end, endeavoring to produce finished product in the shape of wire and paying what they have been paying in the open market for a 4-inch billet. Hence many are now building, and some have already put up, a small open-hearth steel plant for the purpose of making their own steel, buying their pig iron and scrap in the open market to do so. The first difficulty they encounter is the small amount they require for their business. It is not profitable nor economical for them to put up and use a blooming mill, hence they have resorted to the making of a small ingot and the rolling of the same into finished material direct from the initial heat of the ingot, thus copying from the method adopted by the German manufacturers. And there are several small plants now going up in this country, some of them being now in operation, that take a 6-inch or a 7-inch ingot, heat it, roll it down to a certain size, cut it into two parts, then roll the two parts one after the other by the same heat into finished merchant bars.

Among the most remarkable feats in the rolling of steel ever known is the method adopted by the Page Woven Wire Fence Co., of Monessen, Pa., for making wire rods direct from the initial heat of the ingot. Some 30 years ago the writer saw the same sized ingot, but not so heavy, rolled into rails and the same was done commonly as the best method known in the art at the time. The size of that ingot was 9 inches square at the butt, and it was rolled into rails at the works of the Cleveland Rolling Mill Co. prior to 1870. This ingot at that time was not rolled direct into rails but was reheated before rolling. At the Page Woven Wire Fence Co.'s plant they have two 20-ton open-hearth furnaces, in which they make basic open-hearth steel, producing 9-inch ingots, weighing about 1,000 pounds each. These ingots are taken direct to the rod mill furnace and are reheated on a continuous heating furnace, whence they are pushed out automatically direct on to a table in front of a three high 24-inch roughing mill of the Mackintosh type. The 9-inch ingot is reduced on this roughing mill to a 4-inch square billet in nine passes. At this stage we have a 4-inch billet weighing about 1,000 pounds hot enough for further reduction. The first end is cut off this 4-inch billet, it then passes direct, without reheating, into a continuous billet mill which in four passes reduces it to 1¾ inches square. This 1¾-inch square leaves the continuous billet train about 90 feet in length and it passes from this through a long, narrow channel, direct without stoppage into the finishing continuous train. This long, narrow channel is kept hot by the long billets passing through and assisted by jets of natural gas placed at different positions. The jets are for the purpose of retaining the heat that is already in this 1¾-inch square, not for adding any additional heat to it, and this because of the slow speed of the first pass of this continuous train. There are ten sets of rolls in line in this train. The billet enters when it is 1¾ inches square and it comes out of the last set of the train when it is ¼ inch square. Here an operator grabs the first end and turns it into a set of rolls running parallel with the last set of the continuous train. Then on the other side an operator grabs the first end and turns it into the next set, and so on for four sets. Leaving this last set the rod is led on to a reel anl there we have a 1,000-pound ingot rolled direct in one heat into a No. 5 rod—one end in the reel and the other outside of the long channel in front of the continuous train. Owing to the fact that a No. 5 rod, 1,000 pounds in weight cannot be drawn into wire under our present methods in the wire mill, this rod is cut into three parts and is rolled into three pieces; and the point at which it is cut is as it emerges from the last set of the finishing continuous train when the section is ¼ inch square. Like a good many other remarkable inventions, this one was brought about not by the calculation and forethought of the engineers who designed and made the drawings in detail for this plant, but as a result of actual necessity; and the suggestion of rolling the entire ingot in one piece came from a man who five years before had rarely if ever seen a rod mill. He knew nothing at all about making steel; was born and raised on a farm; but like a good many others so reared in this country he was a natural born genius. The man who was chiefly instrumental in making the Page Woven Wire Fence Co. the great success that it is, invented the machine to make this fence and who today is as quiet and unassuming as an 18-year old boy on a farm, is Charles M. Lamb, second vice president of the Page Woven Wire Fence Co. The writer considers the above a most remarkable feat in the rolling of steel; yet when the suggestion was first proposed he was on the point of ridiculing it. But the necessity of the hour was so urgent that something desperate had to be done. The general plan accompanying this article very clearly shows the whole plant, and the methods of operation as described above can easily be traced by anybody who is at all acquainted with wire rod mill practice.

It is the firm opinion of the writer that the time is fast approaching when a very large quantity of merchant steel and rods for domestic use will be made from a small ingot. When we think that at the present time there are more than 36 blast furnaces in course of construction in the United States, and when we keep in mind the steel corporation's large purchases of pig iron at stated periods for the special purpose of keeping up the price of same, and in addition to this the availability of pig iron from the South and from Sydney, Nova Scotia, the prediction is bound to seem a reasonable one, that pig iron will always be accessible at a competitive price. And if it can be shown that a small ingot can be produced from pig iron and scrap and the same rolled into finished material at anywhere near the cost at which steel from pig iron and scrap was produced during our last panic—assuming the cost of pig iron to be the same as it was at that time—a man with a small capital can put up a modern sized plant and can produce material as cheaply as the steel corporation, and even at a cost which the great corporation cannot meet, mainly owing to the extent to which its stock has been watered.

New Pipe Threading Devices.

The Toledo Pipe Threading Machine Co., of Toledo, O., has designed a series of stocks, dies, taps and pipe threading devices and the company is already in a position to fill orders for the small machine which cuts pipe to 2 inches. The next size is under construction and will cut from 2½ up to 4 inches. The 2½ to 4-inch, and the 4½ to 8-inch, machines are however in such shape that shipment cannot be promised for from four to six weeks and possibly longer. The company has aimed to bring out a product entirely different from anything in the line of pipe threading machinery previously manufactured. For instance, in order to cut taper threads it is usual to have the dies deep enough to cut the taper the desired length. The present design obviates this difficulty by allowing the dies to spread as they progress on the pipe. This is made possible by taper pins placed behind each of the four cutting bits. These pins are the same taper as standard pipe thread, namely ¾ inch to the foot, and as the dies travel onto the pipe they also slide along these taper pins which allow them to open gradually, a process which materially diminishes the friction of pipe threading. One man can easily cut a 2-inch pipe and a 2½-inch pipe can be threaded in 45 seconds, a 3-inch in 1¼ minutes and a 4-inch in 6 minutes.

David H. Moffat and his associates in the Denver, Northwestern & Pacific R. R., announced a few days ago that they had secured 12,000 acres of coal lands in Kouet county, Col. The entire tract is said to be underlaid with veins of high grade anthracite. Shipping will be begun in 60 days and it is claimed that the coal can be put into New York at $6 per ton.

Among recent orders for locomotives are the following: Union Pacific, 70 freight and passenger; Northern Pacific, 50; Tennessee Central, 12; Lake Shore, 45; Wisconsin Central, 6; Colorado & Southern, 15; B. & O., 100.

The strike of the machinists of the Pennsylvania Engineering Works, New Castle, Pa., has been settled and the men have returned to work at an advance of 5 percent.

Edmund Guile and Adolph Aschoff, engineers, of Rio Janeiro, who are at the head of a project involving a capital of $15,000,000, have been at Niagara Falls studying the power plant. The Brazilians have a similar project in connection with one of the large rivers of their country.

A NEW LINE OF BORING AND TURNING MILLS.

The Baush Machine Tool Co., of Springfield, Mass., has brought out a new design in its line of boring and turning mills which is illustrated in Figs. 1 and 2. The halftones show the 37-inch boring mill but the machine is also built up to 41, 51, 54 and 61-inch sizes.

There are independent feeds for each head operated by the Hendey-Norton speed changing device, the gearing in this instance giving a series of fifteen changes ranging from 1-64-inch to 9-16-inch vertically, and from 1-64-inch to 7/8-inch horizontally, per revolution of the table. Each of these changes of feed can be made practically on the instant without stopping the table. The heads can be operated independently of each other and by means of a split nut and rack and pinion may be moved back and forth very quickly, a possibility which has a decided advantage in setting up for different classes of work.

The back gears are so arranged and located that they can be thrown in and out by means of a lever without the use of a lock nut. The cross rails are raised and lowered by power, the driving pulley being placed above the housings in the center of the machine and belt driven from another pulley on the

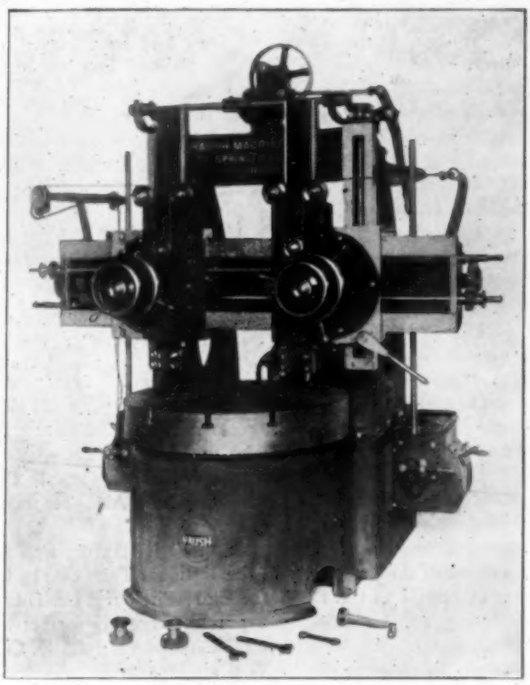


FIG 1.—THE BAUSH BORING AND TURNING MILL

end of the cone shaft as seen in Fig. 2. This design obviates the need of a belt from the countershaft and in case of an electric drive the machine becomes selfcontained .

The tables are removable and may be replaced by an independent, or an independent and universal, chuck interchangeably. There is an outer bearing with an automatic oiling device which maintains a thorough and constant lubrication of the surfaces. The main bearing is of ample dimensions, large and long, with a hole down the center allowing the chips to pass through and be removed from the bottom of the mill without clogging.

Arrangements have been made so that the machines may be driven by a motor; the regular cone and bearing being removed for this purpose and the motor frame attached directly to the bed of the mill.

Extensive repairs are being made at the plant of the Troy Steel Co., Troy, N. Y., recently sold at receiver's sale, and it is altogether probable that a portion of it will be placed in operation within a few months.

The Toledo, O., plant of the Republic Iron & Steel Co., resumed operations this week after being closed for repairs for the past two months.

SUGGESTED AT THE SHOP.

BY F. O. REMAN.

One of the kindly critics has struck a note that seems a little out of tune. He goes back to the crossroads shop of his early days in machine making and finds among its old equipment a thing or two of worth, of surpassing worth, even in these later times. He turns to the modern shop with its steel frame and sees no reason why this advanced product could not be given a greater usefulness by an adoption in part of the engineering devices of the past. For instance, the old shop had a drilling machine fastened to the lower end of a stout post that came down from the rafters but did not reach the floor. The drill could be used on the center of a large circle and was mighty useful. Such an arrangement is now seldom if ever seen, but with the growth of steel structural work for machine shops it would appear to be one of the easiest things in the world to apply. Yet it is among the missing.

* * * * *

The fact is right here. The modern school does not seem to admire the old plan of making machines a part of the building. The only exception to this general rule is in the

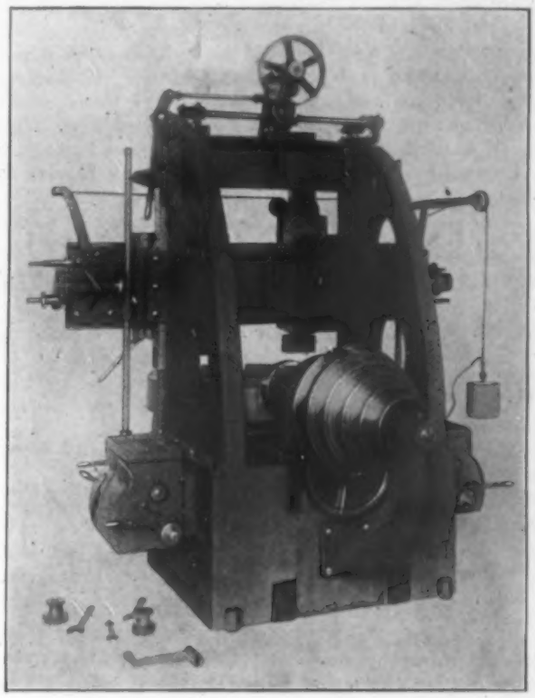


FIG. 2.—THE BAUSH BORING AND TURNING MILL.

case of cranes. The tools are made at the present time so that they are more independent of the shop roof, floor and walls than ever. The old machine got a good share of its stiffness from the solid foundation, but a modern machine tool is so self-contained that it stands firmly on its three-point bearings and the well braced mass of metal is as nearly vibration-proof as it can well be made. The miserable pull of the belt which was wont to yank the tool up from the floor is now replaced by a self-contained electric drive and thus another source of trouble is removed.

* * * * *

I went into an old shop recently where things are run on the lines laid down in the long ago. It is not an easy thing to change matters in these shops. Habit is strong and there seems to be something about the older shops which hypnotizes the workmen into a certain gait and condition which is there to stay. It is easier to travel in a rut or groove than to get any other sort of motion, and this applies to shops as well as machines. Though it may be said that after all a machine shop is a machine and if this were only more often recognized there would be less hesitation about changing methods or equipment about the plant. The shop I have in mind has outgrown its plant and is going to make a complete change. New shop, new

tools and new location have been decided upon and the influence of any of these things has all the strength of a perpetual vacation. Things will be different in the new works.

* * * * *

The old shop has a horizontal drilling machine among its stock of tools that reminds me somewhat of my antiquated friend, the suspended drill. It is attached to one of the columns supporting the crane runways and in front there are two tracks on which a table can be moved by means of four wheels and the aid of a pinchbar. The drill can be adjusted vertically within a wide range and the heavy table and the tracks provide for a handily arranged and solid setting of the work. Perhaps this too will go to the old shop but I trow not. It is not of the kind that would thrive in the new field. It wouldn't give the right kind of an atmosphere and the new workmen would not get the benefit of the climate sought by the management.

* * * * *

Where the old shops fell down was on the crane service. Then was the day of the roll, bar and muscle; the insertion of a lever under the edge of a heavy casting and the time-consuming lift with the help of shingles and other packing. The modern crane picks up the load and rushes away at the rate of several hundred feet per minute. None of the snail-like progress along the floor and over the unsteady plank foundation. I am looking to the crane to take a better hold than ever in its chosen work of unlifting things in the shop. It will probably give the whole business a lively boost when it gets properly handled and developed. When our friend who seeks the inverted post drill gets his crane into gear properly he may find it possible to make quite a machine tool out of it.

* * * * *

Some time ago I saw a contrivance at work in the streets which suggested the way men outside of the machine shop take all sorts of liberties with the standard methods of doing things. A lot of piles were being driven by a suspended steam-hammer. A torrent of blows hustled the piles into the ground at a wonderful rate as compared with the old pile-driver with its leisurely clumsy and top-heavy action. That steam-hammer pile-driver suggests something of the future of the machine shop crane: not to be confined to the handling of raw material on its way to cutting tools but as a means of bringing the tools themselves into action. A machine shop laid off with electric wire, plenty of plug sockets and an outfit of electrically driven tools and cranes can easily adjust itself to a variety of work that would worry the weary manager of the olden days well nigh to the point of departure.

* * * * *

An Eastern city has an example of this ready utility of the electric fluid, which I was fortunate enough to see on one of my trips. For some reason or another a lot of drilling and other machine work was necessary on the street railway—some counterweight installation or another. Did the manager think of tearing up the rails and structural work and drag it into the shop? Did he bring a gang of men down there and get to work with ratchet drills, hammers, cold chisels and the rest of the get-there-quick, rough-and-ready equipment with which the old time foreman would have hustled the outside job to a finish? Not he.

* * * * *

He got a plain platform car and mounted his tools on it along with a 25-h. p. motor taken from the storehouse and of regular street railroad type. He connected a standard controller to his outfit and had a hooked pole instead of a trolley. When his car had been drawn to the place of operations, the hook on the pole was hitched over the live wire overhead and the whole thing was ready for business.

* * * * *

But this extension of the machine shop does not exhaust all the possibilities of electricity by a whole lot. The use of electricity in moving engine valves, reversing machinery, such as planers, shapers and the rest, is a very evident probability of the near future. Then again in jig and fixture work where a template, a bush or a guide of some kind is to be held by a hinge, a cam lever, a setscrew or a bolt; a magnet could take the place of any of these and for the time being the action would be positive and speedy in grip, release and convenience. This is another of the schemes to make the coming shop travel along lines that were not foreseen by the craftsmen of the bygone days. Magnetism has a longer reach, for example, than the ordinary bolt and is far more elastic. When the magnetic planer and lathe chucks, the platen of the milling machine, shaper and other tools are capable of being magnetized and demagnetized by the simple turning of a switch or the pressing of a button we can expect a more intensified pull on the profit-making end of the business. For if these improvements stand for anything at all it is in the line of cutting down the time spent in hunting things, makeshift contrivances for fastening work, etc.,—incidentals that filch just so much of the time that should be spent in cutting away the surplus metal. This greater effectiveness of the shop of the future (maybe of the present) cannot but develop something entirely different in the general method and practice of metal working.

PERSONAL

Charles T. Schoen, founder of the pressed steel car industry, spent several days in Pittsburg last week, perfecting plans for the erection of his new car wheel plant at Butler, Pa.

Hon. William Flinn, George W. Darr and John Stevenson, Jr., directors of the Sharon Steel Co., Sharon, Pa., left Pittsburg last week for the Lake Superior regions to inspect the ore property owned by the company in that district.

E. Norton, of Catasauqua, Pa., has been appointed furnace superintendent for the Troy furnace plant on Breaker Island, N. Y. The furnaces are now being repaired and overhauled and will be blown in at an early date.

J. S. Unger, superintendent of the armor plate department of the Homestead plant of the Carnegie Steel Co., sailed for Europe last week. He will be gone about three months.

John Crerar, of Crerar, Clinch & Co., of Chicago, has been elected a director of the Republic Iron & Steel Co. to succeed Randolph S. Warner.

F. M. Highberger, of the Carnegie Steel Co., has been placed in charge of that company's agency in the city of Mexico, Mexico. He succeeds W. B. Weston, who will go to St. Louis as assistant manager of sales under W. J. Totten.

J. K. Davies, manager of the Complin Steel & Tinplate Co., Swansea, Wales, has been in Birmingham, Ala., for some time inspecting iron and steel plants.

A farewell dinner was tendered Col. F. J. Hearne, who recently resigned the presidency of the National Tube Co., by his former associates at the Duquesne Club, Pittsburg, on Thursday evening, August 28. Those present were his former associates, including Taylor Alderdice, Peter Boyd, John D. Culbertson, A. K. Church, George G. Crawford, F. H. Crockard, William Crockard, H. R. Gilbert, Capt. D. P. Jones, W. L. Kauffman, A. M. Lally, William H. Latshaw, W. N. Martin, J. H. Matheson, B. C. Moise, J. H. Nicholson, C. I. O'Connor, Charles Patterson, Peter Patterson, George N. Riley, William B. Schiller, R. C. Stiefel, A. T. Stewart, J. F. Townsend, George Timmins and Edward Worcester.

J. L. Birch, master mechanic of the upper and lower mills of the American Steel Hoop Co., Youngstown, O., has been appointed master mechanic of the entire district. David Rosser succeeds Mr. Birch at the upper mill and John Solomon at the lower plant.

Richard Brindsley Sheridan, of the London office of the Brown Hoisting Machinery Co., Cleveland, sailed a few days ago after a short visit to the United States, on business with the company.

Count Von Thiele-Winckler, a mine owner and financier of Berlin, will arrive in the United States in a few days, accompanied by several steel experts, and will make a study of the manufacture of steel in this country.

Ambrose Swasey, of Warner & Swasey, Cleveland, is about to start on a trip around the world and will be absent a year.

The Lalance-Grosjean Co., Harrisburg, Pa., has under erection five additional annealing furnaces and several electric generators are being installed to take the place of a number of small steam engines about the works.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

The Enterprise Iron Co., with a capital of $150,000 has been granted a New Jersey charter for the purpose of operating a steel plant in Wisconsin, the place not yet being made public. F. F. Rusher, D. R. Connell and B. A. Keed are the incorporators.

The Fitzgibbons Boiler Co., Oswego, N. Y., contemplates the removal of its plant to Waterloo, Ia., providing $35,000 of the stock of the company is taken by Waterloo citizens. The company will be capitalized at $100,000.

The Electric Construction and Machinery Co., of Rock Island, Ia., has been incorporated with $25,000 capital to manufacture electrical machinery and equipment. John T. Marron, W. H. Dickman and H. T. Schmidt are the incorporators.

The Stamford Engine & Machine Co. has been incorporated under the laws of New Jersey with $250,000 capital. W. M. Lawson, W. F. Ellis, G. C. Gamwell, Samuel Hale and John V. Bonvier are the incorporators.

The Jackson Shovel & Tool Co., of Montpelier, Ind., has been incorporated with $100,000 capital for the purpose of operating a plant to manufacture shovels and contractors' tools. William C. Jackson, F. E. Bowell, James H. Channon, J. Whitaker and Harry Channon, all of Chicago, are the incorporators.

John M. Fleming, of Sharon, Pa., is promoting a company to have $50,000 capital for the purpose of erecting and operating a boiler plant.

The Ross & Frank Boiler Co., of Chicago, has been incorporated with $5,000 capital for the purpose of manufacturing boilers, tanks, etc. James Ross, J. A. Ross and R. E. Frank are the incorporators.

The American Rolling Mill Corporation operating mills at Muncie, Ind., Muskegon, Mich., and Sandwich, Ill., has purchased the plant of the Continental Chain Co. located at East Chicago, Ill. The plant will be operated as heretofore although it is probable that several additional lines of finished product will be added to the present output.

The Bellefontaine Foundry & Machine Co., Bellefontaine, O., has been incorporated with $50,000 capital for the purpose of erecting and operating a foundry and machine shop. W. W. Fisher, J. M. Elrite, R. F. Tremain, John E. Welsh and Charles B. Harnell are the incorporators.

The Coryell Coal & Iron Co., Williamsport, Pa., has been organized as successors to the firm of J. G. Coryell & Co., dealers in coal, coke and pig iron. The members of the firm are F. H. Payne, J. G. Coryell and Garrett Cochran.

The Western Stove Co., Ltd., has been formed by Frank J. Taylor, who has for some years been buyer for the Gurney Foundry Co., Ltd., of Toronto, and J. J. Cunningham, formerly mechanical superintendent of the same company. The new company has purchased the plant of the National Iron Works, Wingham, Ont., and expects to have stoves and ranges on the market this fall. Mr. Taylor asks that catalogues of supplies, etc., in the lines that will naturally be purchased for the new company be sent to him at Wingham.

The Empire Iron & Steel Co., of Niles, O., organized some months ago to manufacture iron and steel sheets, expects to start its plant by Oct. 1. Its product will be sheet iron and steel and angles for light structural work. Sheets will be manufactured up to 60 inches wide and from No. 16 to No. 30 gauge, a specialty being made of a guaranteed double refined iron sheet, also range steel and bowsocket polished sheets. The plant consists of 6 hot mills, 2 cold mills and a three-high 24-inch bar mill. The galvanizing plant will be in operation about Jan. 1. In angles the output will be about 100 tons a day, the heaviest angles rolled at the start being 4x4 inches. Wade A. Taylor is president and treasurer of the company; Chas. S. Thomas, vice president and manager, and J. F. O'Dea, secretary.

National Roller & Ball Bearing Co., 33d and K Sts., N. W., Washington, D. C., asks prices on improved cabinet turret lathe about 18 inches by 6 feet; universal monitors, screw machines, 48-inch boring mill, universal milling machine with vertical attachment, universal grinding machines, vertical-spindle grinders, band saw, jointer, patternmakers' lathes, combination band saws, hub-boring machine, universal trimmers, etc.

Fitzgerald Iron Works, J. Everett, manager, Fitzgerald, Ga., is in the market for 12-inch by 4 to 6-foot screw-cutting lathe, 18 or 29-inch by 12 to 20-foot engine lathe, 32-inch or 36-inch by 6-foot engine lathe, 16 to 20-inch shaper, 24 to 30-inch by 6 to 10-foot planer, combination pipe and bolt cutter, pipe threader 2½ by 6 inches, medium emery-wheel grinder, foundry cupola, blower for 24-inch cupola, 24-inch upright drill press, small tools, etc.; new or second-hand.

The American Brazing Co. has been incorporated under the laws of New Jersey, with a capital stock of $2,000,000, to carry on a business of brazing cast iron and other metals. The incorporators are Hugh A. Ward, Manhattan; Charles H. Ehrenstrum, Brooklyn; William B. Sheppard, John A. Lane and Alfred K. Chamberlin, Manhattan; K. K. Atkinson, Brooklyn, and Richard E. Herman, of Jersey City.

The Leetonia Tool Co., Salem, O., has increased its capital from $3,000 to $10,000.

The Boley Wire Fence Co., of Sandusky, O., Jacob Kuebeler, president, has increased its capital stock from $30,000 to $50,000.

Southern Brass Mfg. Co., Room 4, 110 St. Paul St., Baltimore, Md., will need automatic turret lathe, Fox lathe, buffing and grinding machine, shafting, belting, and either boiler and engine or electric motor.

The Advance Pump & Compressor Co., of Battle Creek, Mich., capital $150,000, has been incorporated.

The American Anchor & Foundry Co., Lima, O., has been incorporated by Jesse. L. Smith, H. S. Moulton, T. A. Robinson, W. H. Woolery and O. F. Ramsayer.

J. D. Cousins, 541 Abbott Road, Buffalo, is in the market for boiler makers' tools.

The Koss & Frank Boiler Co., Chicago, has been incorporated with a capital of $5,000 to manufacture boilers and tanks.

The International Importing & Mfg. Co. has been incorporated at Waterville, Maine, with a capital of $500,000 for the purpose of dealing in machinery and inventions.

The Jackson Shovel & Tool Co., Montpelier, Ind., has been incorporated with a capital of $100,000. The directors are Wm. C. Jackson, Frank E. Bowell, Jas. Channon, Jonathan Whitaker and Harry Channon, all of Chicago.

Fires and Accidents—

The Bridgeport Tube Works, located near Norristown, Pa., were recently destroyed by fire, entailing a loss of $10,000.

The Fitzgerald Foundry & Machine Works, Fitzgerald, Ga., was recently destroyed by fire; loss, $4,000.

The burning of a part of the plant of the Huntington Stove & Foundry Co., Huntington, W. Va., Aug. 28, will involve a loss of $30,000; insurance, $11,000.

The Wingate Machine Co.'s plant at York, Pa., was damaged to the extent of $15,000 by fire Aug. 28.

New Construction:

Frank Stutzman, Williamsport, Pa., who recently disposed of his general machine shop, is now erecting a plant for the manufacture of cutter heads exclusively.

The Utica Pipe Foundry, Utica, N. Y., will extend its foundry by the erection of an addition 60x150 feet.

The Grafton Foundry & Machine Co. is erecting a new foundry and machine shop at Grafton, W. Va.

The addition to the foundry of Pawling & Harnischfeger, Milwaukee, Wis., will be 44x200 feet.

The Poughkeepsie Foundry & Machine Co., Poughkeepsie, N. Y., has purchased a site on which it will erect a new plant, and will soon be on the market for new foundry equipment.

Frank S. Betz & Co., Chicago, manufacturers of surgical instruments, will erect an addition to their factory at Summerdale, Ill. It will be three stories, 100x400 feet, and will cost $100,000.

Plans have been completed for a machine and blacksmith shop, three stories, 97x297 feet, to be built in connection with the American Tin Can Co.'s plant at Chicago.

The Queen City Wheel Co., of Cincinnati, recently incorporated, is erecting a three-story building, 50x100 feet, and will equip it with a gas engine, power hammers, tire setting

machines, drills, emery wheels and brazers. Wm. W. Bobb, 420 E. Seventh St., Cincinnati, is the secretary.

Excavation has been begun for the building of a large addition to the boiler shop of the Holthoff Machinery Co.'s plant, Milwaukee.

The National Foundry Co., Brooklyn, N. Y., has purchased a site and will build a modern foundry building for its exclusive use at a cost of $50,000.

G. E. Montague, Springfield, Mass., will erect a two-story building, 50x150 feet, to be used for the manufacture of tanks, engines, farming tools and windmills.

The laying of the foundations for the open-hearth steel plant of the Youngstown Iron, Sheet & Tube Co., at East Youngstown, O., has been commenced.

The work on the new buildings of the Eureka Foundry Co., Chattanooga, Tenn., is nearly completed and the installing of machinery will soon be begun.

The General Electric Co., at Schenectady, N. Y., is about to erect a new machine shop, 800x135 feet.

The recently incorporated Kay-Pim Mfg. Co. will equip a foundry and machine shop and sheet metal working plant in St. Louis which will employ at the start about 150 men. The directors have closed a ten years' lease on a large biulding now vacant. The company's specialty will be the manufacture of elevating, conveying and power transmitting machinery. Equipment has not all been bought. The company will employ its own engineers on the work of arranging the plant, but will have an opening for a good engineer familiar with the above line.

The Rochester Machine Screw Co., Rochester, N. Y., whose building was destroyed by fire, has rebuilt on the old site and will occupy the new structure by Oct. 1.

The Wright Taper Roller Bearing Co., Buffalo, N. Y., recently incorporated with a capital of $900,000, is working on plans for its new plant. Grading has already been begun on the two acre site. The plant will have a three-story main building of steel frame and brick, with separate rooms. Tapered bearings consist of tapered rollers, revolving on circular cones. The company expects to turn out 100,000 sets annually from the new plant, and will employ about 500 hands.

The plant of the Malleable Iron Fittings Co., Branford, Conn., is being practically doubled in size by the erection of a number of additions. The addition to the annealing department is 200 feet long and 118 feet wide while the foundry is being extended 150 feet. A new core room together with a galvanizing department is also being erected. This building will be two stories high, 150 feet long and 50 feet wide.

The Pittsburg District:—

The Iron City Spring Co., with $500,000 capital has been organized for the purpose of operating a plant to manufacture railway springs. The Fox plant of the Pressed Steel Car Co., in this city, has been purchased and will be immediately equipped with machinery for the manufacture of springs. The plant will have an annual capacity of about 15,000 tons. D. C. Noble, formerly treasurer of the A. French Spring Co., will be president and treasurer of the new concern; T. H. Given and L. C. Noble will be vice presidents; the board of directors will include the above officials together with Henry Aiken, James Neale and T. N. Motley. Efforts will be made to place the plant in operation about Jan. 1, 1903.

The plant of the A. Garrison Foundry Co., located on the South Side, is being practically rebuilt. A new foundry is to be erected to replace the present shop and a three-story building 48x120 feet is being erected to be used as a pattern shop and pattern storehouse. A new power house is also to be erected to contain three 125-h. p. gas engines. A 67-foot extension has just been completed to the machine shop.

The two additional stacks that the Carnegie Steel Co. is erecting at its Edgar Thomson plant, Braddock, Pa., will be placed in operation shortly after the first of the year. Considerable progress has already been made on the stacks and stoves.

The Union Spring & Mfg. Co., of Pittsburg, will apply for a Pennsylvania charter on Sept. 8. The new company will manufacture springs, etc. The incorporators are A. E. Anderson, H. Q. Turner and J. B. Immler.

Charles T. Schoen has purchased a site of about 40 acres near Butler, Pa., upon which the erection of a car wheel plant will soon commence. The plant will be equipped for rolling car wheels by a new process described in these columns some time ago. The plant will have a capacity of about 400 wheels per day.

According to census reports just issued, the iron industry constituted 89 percent of the industrial output at McKeesport, Pa., during the year 1901.

General Industrial Notes:—

The new tube mill which has been under erection at the plant of the Wheeling Steel & Iron Co., Wheeling, W. Va., the past two years, was placed in operation last week. The mill is equipped to manufacture steel and iron tubing from ¼ to 16 inches in diameter and has a capacity of 75,000 tons annually.

The Hart & Crouse radiator plant, under erection at Utica, N. Y., is fast nearing completion and the first cast will be made in the foundry shortly. The foundry is 225 feet long and 62 feet wide while the cupola house is 80x62 feet. The cleaning and testing department is the same size as the cupola house while the machine shop is 225x62 feet.

For the purpose of making repairs the Bessemer plant of the Republic Iron & Steel Co., Youngstown, O., is closed this week. The customary July shutdown was omitted this year on account of the heavy demand for steel.

The Youngstown Engineering Co., Youngstown, O., has received an order from the Carnegie Steel Co. for a 40-ton crane with a 15-ton auxiliary hoist having a span of 60 feet. The crane will be installed at the Carrie blast furnace plant.

The new plant of the Meyer Bros. Furnace Co., at Peoria, Ill., which replaces the one burned in June, is now in operation. The new structure is of brick, 83x175 feet.

About $5,000 will be expended by the Dickson Car Wheel Works, of Houston, Tex., in improvements.

A meeting of the stockholders of the Sharon Coal & Limestone Co., Sharon, Pa., will be held on Nov. 8 for the purpose of voting on a proposed increase in the capitalization from $200,000 to $300,000.

Ten of the hot mills of the tin plate plant of the Sharon Steel Co., Sharon, Pa., resumed operations this week.

Frank Gardner's Sons, operating the Letort Axle Works, at Carlisle, Pa., have purchased the Standard Axle Works, at Millersburg, Pa., and have commenced dismantling the plant. The machinery is being removed to the Carlisle plant which is being considerably enlarged.

It has just been announced by the officials of the Amalgamated Association of Iron, Steel and Tin Workers, that the proposition for a 25 percent reduction in wages on all rebate plate rolled in the mills of the American Tin Plate Co. has been defeated. The hot mills of the following plants of the American Tin Plate Co. are idle at present: Shenango and Greer mills at New Castle, Pa.; the LaBelle, Wheeling, W. Va.; Anderson, Ind.; Gas City, Ind.; Connellsville, Pa.; Elwood, Ind.; the Pennsylvania Works, New Kensington, Pa.; Muskegon, Mich.; Lisbon, O.; Canoneburg, Pa.; Irondale, O.; Atlanta, Ind. The Laughlin plant at Martins Ferry, O., is in partial operation.

The Alberger Condenser Co., of 95 Liberty St., New York, has recently entered into a large contract with the Commonwealth Electric Co., of Chicago, for a complete condensing plant, to be installed in that company's new power house at Chicago. This plant will include one of the largest surface condensers ever furnished for use on land. It is of the Alberger high vacuum type and will have 20,000 square feet of cooling surface. The pumping plant used in connection with this condenser consists of an Alberger dry vacuum pump with Corliss valves; a centrifugal circulating pump; a hot well with pump driven by Corliss engine; a heater of 2,000 square feet; and two vertical boiler feed pumps. The entire equipment represents the most advanced form of condensing engineering and a vacuum of 28 inches is required to be maintained. This condensing plant will operate in connection with a 7,500-h. p. turbine generator which is to be installed.

COCHRANE HEATERS
"Admirable Service"

"THE COCHRANE HEATER purchased of you is doing admirable service—we have found a great saving in our fuel account by its use." (From a letter sent us by a large manufacturer in St. Louis.)

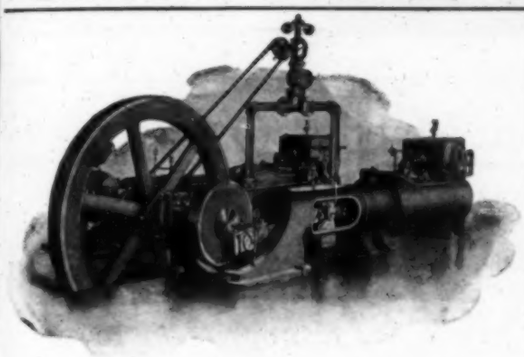
Hundreds of other manufacturers have said practically the same thing, for there are more than 1,500,000 H. P. of "Cochranes" doing admirable service.

The savings made possible by these Cochrane Feed-Water Heaters and Purifiers are: Fuel economy, water economy, practical elimination of boiler repairs, etc. They will heat water to nearly the boiling point. They will improve any boiler feed supply—no matter how bad. They will increase the steaming capacity of boilers. They will——but send for our catalogue, in which is presented the full story of what can be done by the aid of exhaust steam in a Cochrane Heater.

HARRISON SAFETY BOILER WORKS

Clearfield and 17th Sts. PHILADELPHIA, PA.

SMITH-VAILE AIR COMPRESSORS



Are made of the Straight Line and Duplex types; Single and Multiple Stage Compression; Steam actuated with simple or compound Steam Cylinders, or belt driven, for operating Pneumatic Tools, Hoists, Mining Purposes, Pumping Water, Elevating Fluids, etc.

We also make Stilwell Feed-Water Heaters, Steam and Power Pumping Machinery, and the Victor Turbine Water Wheel. For prices, address,

The Stilwell-Bierce & Smith-Vaile Co., M. O. B. 227, DAYTON, OHIO.

TIN PLATES

Coke Charcoal Roofing

Galvanized and Black Sheets

The J M & L A OSBORN CO. CLEVELAND COLUMBUS

TOOL STEEL BALLS

We have the largest and best equipped ball making plant in the world. Regular stock sizes from 1-16 to 4 inches.

Write for catalogue.

FEDERAL MANUFACTURING CO.

CLEVELAND BALL FACTORY

CLEVELAND, OHIO.

DIAMOND MACHINERY CHAINS

Steel drive chains for power transmission — block, roller, cable or balancing, and tubular rivet chains.

Write for catalogue.

FEDERAL MANUFACTURING CO.

DIAMOND CHAIN FACTORY

INDIANAPOLIS, IND.

HOISTING, CRUSHING AND MINING MACHINERY.

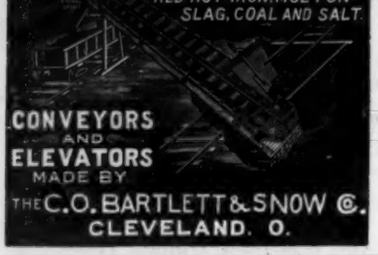
EARLE C. BACON, Engineer,
Havemeyer Building,
NEW YORK.

Send for Catalogues.

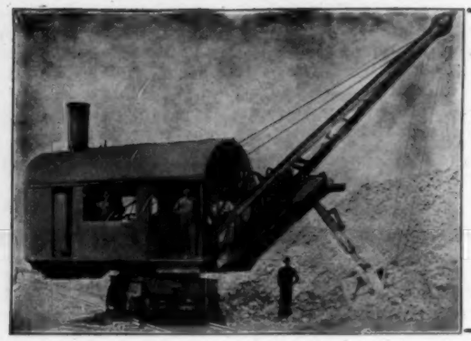
Farrell Ore and Rock Crushers.
Bacon's Hoisting Engines,
Rolls, Gravity Incline Machinery, etc.

WE CONVEY AND ELEVATE EVERYTHING.

TACKS, SAND, ROCK, ORES, RED HOT IRON, MOLTEN SLAG, COAL AND SALT.



CONVEYORS AND ELEVATORS MADE BY
THE C. O. BARTLETT & SNOW CO.
CLEVELAND, O.



The Thew Automatic Shovel Co.
LORAIN, O.
Steam Shovels
for iron ore mining and excavating.
Only one operator required. Shovel works in complete circle. Dipper moves horizontally. Convenient and economical.
Write for catalogue.

DO YOU WANT A BOOK?

Our Book Department is complete, and we can furnish you any standard work at publishers' prices.

THE IRON TRADE REVIEW,
CLEVELAND, O.

The **Link-Belt Machinery Co.**, Chicago, U. S. A.

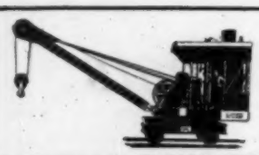
Specialists in the design and manufacture of *LABOR-SAVING APPLIANCES* for the handling of materials in bulk or package. Power transmitting machinery, up-to-date coal and ashes handling equipment for power houses, etc., etc. :: :: :: ::

ILLUSTRATED CATALOG No. 28-B JUST OUT—SEND FOR IT.

Philadelphia: THE LINK-BELT ENGINEERING CO.,

The Exeter Machine Works, PITTSTON, PA.

NEW YORK OFFICE: 120 Liberty Street.
CLEVELAND OFFICE: 807 New England Building.
Manufacturers of
Hoisting Engines for Contractors and Mines. Elevators and Conveyors for Power Houses Coal Yards and Mines.



"BROWNHOIST" LOCOMOTIVE CRANES
Are used by the largest Steel Works and Manufacturing Plants.
WRITE FOR "BROWNHOIST" CRANE CATALOG.
THE BROWN HOISTING MACHINERY COMPANY, Works, Cleveland, Ohio.
NEW YORK, 26 Cortlandt St. PITTSBURG, Frick Building. LONDON, 39 Victoria St., S. W.

Reducing the Cost of Production.

IT'S possible!—by using practical, money-saving appliances.

The building of special or standard elevating and conveying machinery—at a very low price—to handle any material—in any form—from any one point to another—is a specialty of ours.

Certainly, we have a catalogue "D" which will be sent upon request.

The Aultman Company, Canton, O.
Eastern Office—PHILADELPHIA, PA.

ELECTRIC TRAVELING CRANES

Hand Power Cranes Locomotive Cranes.

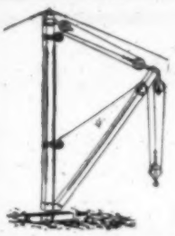
NORTHERN ENGINEERING WORKS, 6 Chene St., DETROIT, MICH.

CLEVELAND CRANE AND CAR CO

WICKLIFFE, O.

PITTSBURG OFFICE FRICK BLDG

CRANES OF ALL KINDS FOR ALL PURPOSES

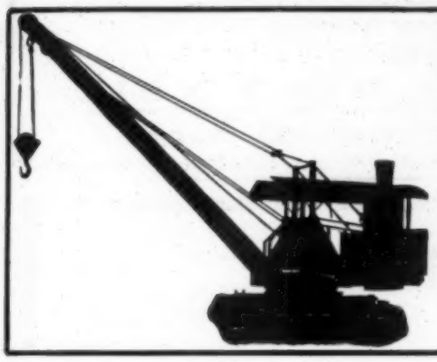


Dobbie Foundry and Machine Co.,

NIAGARA FALLS, N. Y.

HOISTING MACHINERY, YARD DERRICKS, FOUNDRY CRANES, WIRE ROPE SHEAVES AND BLOCKS.

Branch Office and Store 38 Dey St., NEW YORK.



LOCOMOTIVE CRANES

IN CAPACITIES FROM

THREE TO SIXTY TONS.

INDUSTRIAL WORKS,

BAY CITY, MICH.

Overhead Tramrail Systems

are adapted to a thousand and one different uses.

May be you have use for one of our Systems in your shop. Write us about it, we'll be glad to show you where and how it will save its first cost in six months.

Our new 14-page Catalogue will be sent for the asking.

J. W. MOYER & CO.,

1731 Howard St., PHILADELPHIA, PA.

NEW YORK OFFICE: 730 Park Row Bldg.

JEFFREY Electric LOCOMOTIVES

Coal Mining Machines, Coal Handling, Crushing, Screening, Coal Washing, Elevating, Conveying Machinery.

SEND FOR CATALOGUES.

THE JEFFREY MFG. CO.,

COLUMBUS, OHIO.

New York. Denver.

ROBINS SORTING CONVEYORS

Are Far Superior to Picking Tables of Wood and Iron.

New Catalogue just issued.

ROBINS CONVEYING BELT CO.,

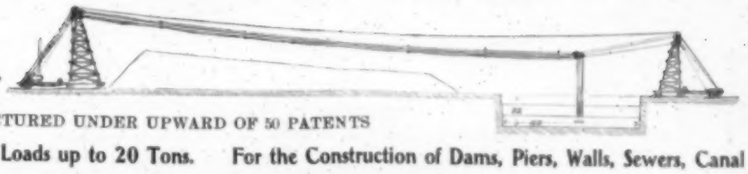
19 Park Row, NEW YORK CITY.

Pittsburg Agents: TATE, JONES & CO., INC. Empire Bldg.

CONVEYING Machines save a lot of hand labor, and machinery of just this type will interest the proprietor when reading THE IRON TRADE REVIEW.

LIDGERWOOD CABLEWAYS

Send for book, "LIDGERWOOD CABLEWAYS."



STEAM and ELECTRIC HOISTS.

MANUFACTURED UNDER UPWARD OF 50 PATENTS

Hoist and Convey Loads up to 20 Tons. For the Construction of Dams, Piers, Walls, Sewers, Canal Excavating, etc.

Lidgerwood Mfg. Co., 96 Liberty St., NEW YORK.

KOKOMO

LET US QUOTE YOU OUR PRICES ON Wire Nails, Coil Spring Wire, Standard and Special Brands of Barb Wire, Market Wire, Ornamental Fences, Window Guards, Bank and Office Railings.

A complete description of our products will be mailed upon request.

KOKOMO STEEL & WIRE CO.
OFFICE AND FACTORY, KOKOMO, IND.

The Cuyahoga Wire & Fence Co.,
CUYAHOGA FALLS, OHIO,
MANUFACTURERS OF
WIRE RODS.
Annealed and Galvanized Fence Wire, and Hartman Wire Fencing.
BRIGHT, TINNED AND COPPERED MARKET WIRE.
Tinned Mattress and Broom Wire.
Annealed Stone Wire.
Wire Straightened and Cut to Lengths. WIRE NAILS.
Works:—Cuyahoga Falls, Ohio. Newcastle, Penn.

WIRE DRAWING AND CHAIN MAKING MACHINERY.

Our line is complete and up to-date. Twenty-five years' experience has given us an intimate knowledge of what is needed and enabled us to build machinery whose records have never been equaled, not only in the past but at the present time. Why not investigate the matter and equip with money-making machinery? We want your order, either large or small.

THE TURNER, VAUGHN & TAYLOR CO., Cuyahoga Falls, Ohio.

The
Lorain Steel Company,
LORAIN, OHIO.

Rails, Blooms, Billets and Slabs.